VILLAGE LEATHER INDUSTRY

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कामये दुःखतप्तानाम्।
प्राणिनाम् आर्तिनाशनम्॥

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FOREWORD

Village tanning is as ancient as India itself. No one can say when tanning became a degraded calling. It could not have been so in ancient times. But we know today that one of the most useful and indispensable industries has consigned probably a million people to hereditary untouchability. An evil day dawned upon this unhappy country when labour began to be despised and therefore neglected. Millions of those who were the salt of the earth, on whose industry this country depended for its very existence, came to be regarded as low classes, and the microscopic leisured few became the privileged classes, with the tragic result that India suffered morally and materially. Which was the greater of the two losses it is difficult, if not impossible, to estimate. But the criminal neglect of the peasants and the artisans has reduced us to pauperism, dullness and habitual idleness. With her magnificent climate, lofty mountains, mighty rivers and an extensive sea-board, India has limitless resources, whose full exploitation in her villages should have prevented poverty and disease. But divorce of the intellect from body-labour has made of us perhaps the shortest-lived, most resourceless and most exploited nation on earth. The state of village tanning is, perhaps, the best proof of my indictment. It was the late Madhusudan Das who opened my eyes to the great crime against a part of humanity. He sought to make reparation by opening what might be called an educational tannery. His enterprise did not come up to his expectations, but he was responsible for the livelihood of hundreds of shoe-makers in Cuttack.

It is estimated that rupees nine crores worth of raw hide is annually exported from India and that much of it is returned to her in the shape of manufactured articles. This means not only

a material, but also an intellectual, drain. We miss the training we should receive in tanning and preparing the innumerable articles of leather we need for daily use.

Tanning requires great technical skill. An army of chemists can find scope for their inventive talent in this great industry. There are two ways of developing it. One is the uplift of *Harijans* living in the villages and eking out a bare subsistence, living in filth and degradation and consigned to the village ghetto, isolated and away from the village proper. This way means part re-organisation of villages and taking art, education, cleanliness, prosperity and dignity to them. This means also the application of chemical talent to village uplift. Tanning chemists have to discover improved methods of tanning. The village chemist has to stoop to conquer. He has to learn and understand the crude village tanning, which is still in existence but which is fast dying owing to neglect, not to say want of support. But the crude method may not be summarily scrapped, at least not before a sympathetic examination. It has served well for centuries. It could not have done so, if it had no merit. The only research I know in this direction is being carried on in Shantiniketan, and then it was started at the now defunct Ashram at Sabarmati. I have not been able to keep myself in touch with the progress of the experiment at Shantiniketan. There is every prospect of its revival at the Harijan Ashram, which the Sabarmati Ashram has now become. These experiments are mere drops in the ocean of possible research.

Cow-preservation is an article of faith in Hinduism. No Harijan worth his salt will kill cattle for food. But, having become untouchable, he has learnt the evil habit of eating carrion. He will not kill a cow but will eat with the great relish the flesh of a dead cow. It may be physiologically harmless. But psychologically there is nothing, perhaps, so repulsive as carrion-eating. And yet, when a dead cow is brought to a Harijan tanner's

house, it is a day of rejoicing for the whole household. Children dance round the carcass, and as the animal is flayed, they take hold of bones or pieces of flesh and throw them at one another. As a tanner, who is living at the Harijan Ashram, describing the scenes at his own now forsaken home, tells me the whole family is drunk with joy at the sight of the dead animal. I know how hard I have found it working among Harijans to wean them from the soul-destroying habit of eating carrion. Reformed tanning means the automatic disappearance of carrion-eating.

Well, here is the use for high intelligence and the art of dissection. Here is also a mighty step in the direction of cow-preservation. The cow must die at the hands of the butcher, unless we learn the art of increasing her capacity of milk-giving, unless we improve her stock and make her male progeny more useful for the field and carrying burdens, unless we make scientific use of all her excreta as manure and unless, when she and hers die, we are prepared to make the wisest use of her hide, bone, flesh, entrails, etc.

I am just now concerned only with the carcass. It is well to remember here that the village tanner, thank God, has to deal only with the carcass, not the slaughtered animal. He has no means of bringing the dead animal in a decent way. He lifts it, drags it, and this injures the skin and reduces the value of the hide. If the villagers and the public knew the priceless and noble service the tanner renders, they will provide easy and simple methods of carrying it, so as not to injure the skin at all.

The next process is flaying the animal. This requires great skill. I am told that none, not even surgeons, do this work better or more expeditiously than the village tanner does with his village knife. I have inquired of those who should know. They have not been able to show me an improvement upon the village tanner. This is not to say that there is none better. I merely give the reader the benefit of my own very limited experience. The

village tanner has no use for the bone. He throws it away. Dogs hover round the carcass whilst it is flayed, and take away some, if not all, of the bones. This is a dead loss to the country. The bones, if powdered fine, a part from their other uses, make valuable manure. What remains after the dogs have taken away their share is transported to foreign countries and returns to us in the shape of handles, buttons, etc.

The second way is urbanizing this great industry. There are several tanneries in India doing this work. Their examination is outside the scope of this article. This organisation can do little good to the Harijans, much less to the villages. It is a process of double drain from the villages. Urbanization in India is slow but sure death for her villages and villagers. Urbanisation can never support ninety per cent of India's population, which is living in her 7,00,000 villages. To remove from these villages tanning and such other industries is to remove what little opportunity there still is for making skilled use of the hand and the head. And when the village handicrafts disappear the villagers working only with their cattle on the field, with idleness for six or four months in the year, must, in the words of Madhusudan Das, be reduced to the level, of the beast and be without proper nourishment, either of the mind or the body, and, therefore, without joy and without hope.

Here is work for the cent per cent Swadeshi lover and scope for the harnessing of technical skill to the solution of a great problem. The work fells three apples with one throw. It serves the Harijans, it serves the villagers, and it means honourable employment for the middle class intelligentsia who are in search of employment. Add to this the fact that intelligentsia have a proper opportunity of coming in direct touch with the villagers.

Harijan, 7-9-'34

—Mahatma Gandhi

PREFACE

Flaying or skinning is perhaps the first art that man acquired and the first craft that he has followed. As a hunter, he had to skin the animal he had hunted before he had access to the meat. He used the meat as his food and the skin or hide as a garment to protect his body from sun, rain and cold. In the beginning he used the hide as it was without any preservative or softening agent. But he soon learnt to rub the fat he got from the animal body into hide and skin to render it water-proof and somewhat pliable and soft. As a pastoral man he gathered large herds of useful animals, domesticated and used them for milking and draught purposes. When they died a natural death, he skinned them and utilised the skin and other remains of the carcass for his own use.

When he became an agriculturist and acquired some knowledge of the vegetable kingdom, he used that knowledge for the preservation and softening of the hide and skin which he was now using, besides as garment, as a container for oils and fats, for ropes, water lifts, saddlery etc., etc. At this period he learnt the preservative and softening processess which are now termed as vegetable tannages. As man studied natural phenomena more closely and developed the different sciences such as physics, chemistry and others, he used this new knowledge also for the advancement of this oldest and first craft. Thus came into being the different types of mineral tannages such as chrome, and others.

As knowledge advanced, man found for his garments different types of fibres from the animal as well the vegetable world which were more comfortable. The hide and skin as a garment

thus acquired a limited and specific use in the form of foot-wear. Man tried several other substances for his foot-wear, but no other material served his purpose so efficiently for this particular need. He tried wood, but it was not pliable, metal which was not soft, coir fibre which, being rough, rubbed against his limbs and could not sustain the strain of his walking foot. Recently he is trying with new substances such as rubber and plastics; but, as they lack porosity, they cannot absorb the moistures of the sweat and give ventilation to the limbs they cover. Leather thus reigns supreme in the domain of footwear.

In modern Indian life this craft has acquired a social stigma. It is considered as low and degrading to be practised only by low caste people. The intelligentsia who considered themselves as more advanced, thought it beneath their dignity to study and follow this ancient craft. That was not the case in the ancient Indian social life. At that time every herdsman used to skin his dead animal and make use of the remains of the carcass. MANU enjoins this duty on the herdsman who milks the herds of his master and takes them for grazing to the pasture lands. This is seen from the following verse:

कर्णौ चर्म च बालांश्च बस्तिं स्नायुं च रोचनाम्
पशुषु स्वामिनां दद्यात् मृतेष्वंकानि दर्शयेत् ॥

The period of the मनुस्मृति is placed, about the 1st century of the Christian era. कुल्लूक भट्ट wrote his commentary on मनुस्मृति about 1500 A.D. While explaining the meaning of the word अंकानि in the original text he says अन्यानि च चिन्हानि शृंगखुरादीनि दर्शयेत्. This means that till the time of कुल्लूक भट्ट this idea of high and low relation to this craft had not permeated Indian society.

Skinning and proper utilisation of the dead body of the animal was a domestic affair of the owner of the animal to be

looked after by him personally or by his domestic servants, in the same manner as the dead body of kith and kin in the family was looked after. It is clear that the remains of the dead body of the animal had attained the status of property to be owned by somebody and not as waste and useless material to be despised and thrown away. We, therefore, do not find reference in our ancient literature to any special class of people engaging themselves for this purpose as we find to-day.

After Prithviraj Chavan (1200 A. D.), the habit of free thinking began to recede and intellectual indolence crept into our society. This intellectual indolence assumed the name of orthodoxy. With the advent of Gandhian era, however, this intellectual indolence began to melt away and people began to interpret our old wisdom and crafts in terms of present knowledge and conditions. An epoch-making person like Gandhiji himself came forward and encouraged the study of this ancient craft in a new way. Those who were following this craft as a low caste with the stigma attached to it for the last 1,000 years or so are awakening and are beginning to refuse to handle their craft as it brought on them t .e stigma of untouchability and social degradation. This should be considered as a good augury as it may help in restoring this work as a duty towards our cattle which worked during their life time for our well-being and benefit. It is at this juncture that the Khadi and Village Industries Commission with the funds placed with it by the Government of India took up the work of carcass recovery and propagate it as a domestic industry in our villages.

This booklet which is being published by the Commission will be found useful and instructive to every householder who keeps animal and cattle. It gives in detail the full process of skinning and proper utilisation of other remains of the carcass so that they can be followed by every householder. Closer study of ancient literature will be found necessary as regards the

craft of tanning to find out in what condition it existed in those days. As social conditions stand today, tanning, foot-wear and other leather goods manufacture cannot be followed by every householder. The pamphlet, therefore, gives the concise outline of that industry for the better understanding of the importance of production of good quality raw hides and skins and their proper preservation.

I hope that this booklet will be appreciated by the public.

G. R. Valunjkar

INTRODUCTION

Hides and skins constitute the raw materials for the manufacture of leather. Trade in hides and skins can be traced to very early times of our history and the art of curing and dressing hides and skins can be said to be one of the oldest practised by man. In the travel notes of Marcopolo, there is enough evidence to prove that the use of hides and skins was known to the Indian people as early as 1260 and 1270 A. D. During the period of Muslim rule, India made considerable progress in leather making, as leather was extensively used for parchment and book-binding purposes. But the trade and industry was confined to a certain class of people who came to be known as "chamars". They are socially backward and economically depressed. Their number is large. Lack of facilities for their education, their economic condition and their environment are reflected in their methods of work and their way of life. No organised efforts were made in the past to improve their condition and they have remained practically neglected. Even though the art of tanning was known to them from very early times, there has been no change in their methods and techniques of work. This explains the present backward condition of the village leather industry.

The Leather Industry, however, has made rapid progress during the last 100 years or so. Due to the introduction of "Chrome Tanning" during the second half of the 19th century and the application of scientific methods to the manufacture of leather, the leather industry has made great headway in the world. During the last fifty years, large and small-scale factories have been set up in India. They manufacture varieties of quality leather with the aid of modern appliances. Such facto-

ries, however, are small in number and they are not able to meet the growing demand for either finished leather or leather goods. Besides these factories, there is a class of tanners who produce leather mainly for export. Their process goes by the name of 'Madras Tannage' and in international trade it is called "E. I. Tanned Hides and Skins". This is a century old business and work in such tanning yards is mostly done with manual labour. No power is used. But the significant fact is that the combined production of tanners and the modern factory establishments is only a fraction of the total production of leather and leather goods in India. According to one estimate nearly 82 per cent of the hides and skins are still processed in the countryside by village tanners. Thus village tanning plays a very important role in the rural economy of the country.

The cottage tanners produce nearly 80 per cent of the total bark-tanned leather turned out in India. The bulk of it is sold in rural areas. These cottage tanners do the tanning with locally available tanning material namely, different types of barks, fruits, flowers and leave (practically every district may have its own local tanning material). They make cheap types of footwear of local design, leather straps and belts, indigenous types of harness and saddlery. The cottage tan yards lie scattered in rural areas. They work today under very adverse conditions and require a great deal of help and guidance. The cottage tanning yards are owned and worked by chamars in their own court yards. The work is done with the help of members of their families and no outside labour is employed. Buffalo and cow hides constitute the bulk of the material tanned. The process followed by the tanners is known as "Bag Tanning" Process. It is a typical Indian cottage tanning process which has been evolved by the village chamars through experience, experiment and practice through the centuries. Some variations may be found in the process from

region to region ; but basically the process all over India is the same.

This process is primitive and the quality of leather resulting from it leaves much to be desired. The raw materials purchased by chamars is of inferior quality, usually the rejection and double rejection which is sold very cheap by the hide dealers. This explains the inferior quality of the leather turned out. The leather is not finished. What finish is applied consists only in the application of salt and rice husk or bark-dust to the flesh-side of the leather. The leather is never dried completely and is often sold in a moist state. The leather contains ugly patches and sometimes gives out foul smell of old tan liquor. All this mars the appearance of the leather. In some States the quality of bark-tanned leather is found to be fairly good and such leathers fetch a good price in the market. But even the good quality leather is found to be lightly tanned. The greatest defect in such leather is its low water resistance.

The average earning of a village chamar is about Rs. 5 to Rs. 5.50 per maund of hides he tans and this figure is worked out as follows:

The chamar with his family can tan about 8 mds. of hides per month. His average cost of tanning one maund of hides will be:

Cost of lime	Rs. 1- 4-0
Cost of bark	Rs. 12- 0-0
Cost of Myrab	Rs. 1- 0-0
Sundry Expenses	Rs. 0-12-0
Total	Rs. 15- 0-0

plus the cost of raw material (Buffalo hides dry) at Rs. 70 per md. So the cost of tanning plus the cost of raw material comes to about Rs. 85 per maund. From one maund of raw material, he manages to get about 1 maund of leather by loading moist

leather with salt or rice husk or bark dust. The average sale proceeds realised for such crude quality leather is generally Rs. 90 per maund. The margin of earning, therefore, comes to about Rs. 5 per maund. But actually he earns much less.

The capital of chamars consists of the equipment cost, viz., pits etc., which is his block capital and that required for buying hides and skins and tanning material is his working capital. The average equipment costs of the chamars may be taken as Rs.200. His working capital depends on his monthly output. His tanning process should ordinarily take from one month in summer to 1½ months in winter (although at some places he manages to lessen this period at the cost of the quality of his product) and, after making an allowance of 15 days more to realise the sale proceeds, two months working capital would be necessary for him to maintain himself and his family. The total capital required can be worked out as follows :

Cost of 8 mds. of dry hides @ Rs. 70 per maund	Rs. 560-0-0
Cost of tanning material @ Rs. 15 per maund	Rs. 120-0-0
Total	Rs. 680-0-0

For two months the amounts required is Rs. 1,360.

If the block capital is added, then the total capital amount comes to about Rs. 1,360 plus 200, i.e. Rs. 1,560.

The investment of village chamars usually ranges from Rs. 500 to Rs. 2,000 for bag-tanning. Large capital investment and equipment, thus, are not necessary and this is its main advantage. Besides, the process is quick and simple.

Any programme or scheme for effective improvement in the living conditions of village chamars must include amongst other things:

i. improvement of raw stock,
ii. improvement in the quality of leather produced,
iii. organisation of co-operative efforts, and
iv. provision of technical assistance.

India is the largest single producer of hides and skins. On an average the annual production of hides and skins in India is as follows :

Animals	Numbers
Cow Hides	200 lakhs pieces.
Buffalo Hides	57 lakhs pieces.
Goat skins	274 lakhs pieces.
Sheep Skins	170 lakhs pieces.

In spite of the fact that India possesses the largest cattle population and is the largest single producer of hides and skins, the condition of animals is deplorable. For the greater part of the year they exist on the starvation level. The quality of hides and skins depends to a large extent on the health and breeding of the animal and good hides cannot be obtained from inadequately nourished and improperly kept animals.

Assuming that the animal is well fed or nourished, and well kept, if it dies naturally or meets an accidental death, then the quality of its hide is likely to deteriorate if it is not flayed properly. Improper and careless flaying sometimes ruins the hide and such hides are rendered useless for making good leather. Thus, even though breeding and feeding determine the innate characteristics of hides and skins, the handling of raw stock makes a material difference in the selection or grading of the raw hides and skins. The defects generally found in Indian hides and skins may be summarised as follows:

1. defects due to diseases, ravages of insects and vermins and to old age ;

2. defects due to wounds and injuries ;
3. defects arising from improper flaying and handling of the raw stock after flaying, i.e., preservation, cure and preparation; and finally
4. defects due to improper loading and to adulteration.

Improvement in the quality of Leather : The defects generally found in leather can be eliminated to a large extent and the quality brought very near to pit tanned leather, if concerted measures are taken regarding the same. If the quality of the leather is improved, the chamar will be able to realise more sale value for his leather. The main cause of the inferior quality of bag-tanned leather is the large demand for the cheap varieties of 'deshi shoes' and chappals. Most of our rural and urban people cannot afford to buy costly shoes made from high class leather and, as long as there is a persistant demand for cheap footwear, the village chamars will go on working with the cheap low grade hides and skins.

Any effort to improve the quality of leather by the introduction of modern processes in villages present many difficulties. Good quality leather requires good quality raw material which is too expensive for the chamars. It would require large capital and costly equipment which also are beyond their reach. To effect improvement in the quality of leather and leather goods in the village leather industry, therefore, other alternatives must be found whereby the existing process of village tanning is improved to produce good quality leather. Can this be achieved? The process of bag-tanning was examined by the technical staff of the Training-cum-Production Centre of the Khadi and Village Industries Commission at Wardha and experiments were carried out on a combination of the *bag* and *pit* tanning processes whereby the disadvantages of bag-tanning were offset by the advantages of pit-tanning. The

quality of leather produced as a result is being appreciated by customers and the product has found a considerable sale in the Nagpur Market and in the surrounding areas. The new process may be followed elsewhere with advantage. Besides this the practice of coating the flesh surface of tanned hides with salt and paddy husk, which is invariably done to inflăte the weight, must be totally discarded. If these step are taken the quality of village tanned leather is sure to improve without any singnificant addition to the cost.

Babul and Wattle are the two main tan stuffs consumed by Indian tanners. The present supplies of the materials are, however, inadequate to meet the growing demand for them. Cottage tanners use mainly Babul and other locally available tanning materials. India imports wattle and other materials from abroad to the tune of Rs. 10 to Rs. 16 million every year. A beginning has been made to make India self-supporting in the production of Wattle-bark. Large areas of land are being brought under Wattle cultivation, and possibilities of its cultivation are bėing explored in States like Uttar Pradesh, Punjab, west Bengal, Assam and Bombay. Apart from Wattle, there are a number of other indigenous tan stuffs which are already in use by cottage tanners. Some of these are Babul, Avaram, Sonali, etc. Effort must be made to conserve this wealth so that India may be able to meet her growing demand from indigenous sources.

Technical Research : Application of scientific methods in the processing of hides and skins has made rapid strides in development of the leather industry in recent times. Old and out-dated methods are being replaced by new and scientific methods in large scale factories. It is now possible to produce sole leather in 20 to 25 days. The Central Leather Reserch Institute which was set up in 1953 by the Government of India at Adyar, Madras, has evolved a number of processes

for the manufacture of *chrome* and *bark* leather to suit Indian climate and conditions. But all this research and the new processes are mainly designed to suit the requirements of large-scale manufacturers. It is high time that such institutes turn their attention and extend the research work to village tanning which even today processes and supplies the bulk of hides and skins and provides employment to lakhs of leather workers in the country. The Village Leather Industry, opens out a vast field for research and for the application of scientific knowledge and techniques to evolve efficient equipment which would be within the reach of village chamars. The technical and commercial aspects of village tanning must be investigated and suitable changes must be made in the processes in order to produce quality leather. The research work should be extended to the various locally available tan-stuffs in different parts of the country, to the matter of grading them and determining how they can be utilised to the best advantage.

Chrome Tanning in Villages : Chrome tanning is new to the village tanning industry. Its introduction has been considered impractical. No serious attention, therefore, was paid even to exploring the possiblity of introducing it in the villages. No doubt, Chrome Tanning involves some measure of chemical control in processing work and requires large capital and costly equipment, besides large outurn of leather to run any centre as an economic unit. But can Chrome tanning not be considered as a cottage craft ? In the rural areas there are large numbers of people engaged in the tanning and leather industry. They have the hereditary skills. Their livelihood and development depend on progress of this industry. Hence the basic conditions are favourable for introducing techniques and process. It should not be difficult to adapt the techniques employed in large-scale factories to suit village production conditions. If this can be done, large quantities of

leather can be turned into chrome with considerable advantage to that class of people which is economically and socially the most depressed.

Co-operative efforts:- The development of the village leather industry will be facilitated if the Village chamars are brought into the co-operative fold. Their co-operative societies can undertake various activities for the benefit of individual members such as the following :

1. The collection and buying of hides and skins and other tanning materials on behalf of the individual members of the society.

2. The society can undertake the selling of all the leathers produced by its members on an agreed commission. If such societies work efficienctly they would be able to build up a reserve which could be utilised to improve the condition of the industry.

3. The society will be in a better position to create the climate for introducing better techniques and providing for better processing facilities for the its members.

4. The society may be an appropriate agency through which community work centres with improved equipments can accelerate the pace of development of the village leather industry.

Co-operatively organised, the village leather workers can create for themselves conditions of work which will make for the production of quality leather, so much so that expansion of large-scale factory production may become redundant.

Technical Assistance : As already stated, the supply of quality hides to the cottage tanners is not possible unless considerable improvement in the raw stock is brought about. The various defects with which the hides and skins are associated

must be eliminated, and this is by no means an easy task considering the prevailing ignorance among our villagers. Sustained efforts on all sides will alone help improve matters. In the village, the primary producer of hides and skins is the village chamar. He is exploited by a number of middle men such as the hide collector, hide dealer and commission, agent. Due to extreme poverty and ignorance about marketing conditions, the village chamar is very often left at the mercy of these middlemen. Again his method of preparing and preserving hides and skins is defective and so he is unable to realise full value for his produce The village chamar must be educated about the proper method of flaying, preparing and preserving the hides and skins.

Technical assistance and persuasive propaganda can bring about a great deal of improvement in our raw stock and for this network of efficient demonstration parties will have to be spread out all over the rural areas. A large number of technically qualified persons will have to be trained to undertake this work. The Training-cum-Production Centres should be equipped with small machines which may be found absolutely essential for making chrome leather. The village chamars can bring all their leather to these centres for machines for work in payment of a nominal fee.

The Centres will tan regularly a few hides and skins, both chrome and bark, and the production will be carrid on a more or less commercial sale to make it a self-supporting unit. The centre will be managed by experienced and qualified staff. The technical hands who receive training at such centres, will constitute the demonstration parties which will tour from village to village and teach village chamars and give for their benefit demonstration about improved method of flaying, preserving and curing the raw stock improved method of bag tanning and chrome tanning. Such centres

will serve a twofold object. Firstly, they will provide the necessary trained personnel for the village tanning industry and, secondly the village chamars, will benefit from the improved quality of their leathers. The demonstration parties will not only give technical assistance to the chamars, but also carry out intense propaganda in the villages about the growing importance this industry has assumed and bring home to them the truth about the tremendous loss our country is making due to the deteriorating conditions of our raw stock and non-recovery of the components of the carcasses. The loss that our country is made to suffer due to defects in the hides and skins is estimated at Rs. 4 crores per year. Besides this, there is also the loss due to non-recovery of the various components of the carcass such as flesh, bones, fat etc. which amounts to nearly Rs. 7 crores per year.

After giving full consideration to all these factor, the All India Khadi and Village Industries Board which was constituted in 1953, prepared a number of schemes for the village leather industry. The main features of these schemes are:

1. Setting up of flaying and carcass recovery centres ;
2. Establishment of model Village Tanneries to improve the conditions of the village chamars and the quality of leather ;
3. Tanning-cum-Production Centres for training in Village Tanning and Carcass Recovery work ; and
4. Marketing Depots, Central and District, to provide marketing facilities.

All these schemes are executed through registered institutions and State Boards. Divisional Offices have been set up in various States. In the light of the experience gained during the

last three years, the Khadi and Village Industries Commission has now made certain changes in the organisational and administrative set up of the Leather Industry Section. Efforts will henceforth be concentrated mainly on the improvement of raw stock (hides and skins) and dissemination of technical information to the field workers and provide marketing facilities to the village leather producers.

CHAPTER I

VILLAGE LEATHER INDUSTRY

India is rich in her animal wealth. There are about 287 million heads of live-stock comprised of 198.8 million cattle and buffaloes, 86 million sheep and goats and 2.7 million horses, mules and donkeys.* At the rate of 2 percent annual increase, the animal population in 1954 can be taken as 304.4 millions. At the usual death rate of 8.5 per cent about 25.6 million cattle die annually in India. In addition, 4.7 million are slaughtered. Generally the carcass are not attended to in time and they are allowed to putrefy in

* Live-Stock Census 1951.

remote villages. A larger number of naturally dead animals are flayed for hides only. Sometimes the flesh is even taken away by flayers for eating purposes. But generally after flaying, the carcass flesh is left to vultures, dogs, jackals, etc. The waste to the nation arising out of non-recovery of the various components of the carcass, such as meat, bones, tallow, horns, hoofs, etc. has been roughly computed at Rs. 7 crores annually. Again an additional loss of Rs. 3.5 crores is sustained on account of defects in hides and skins due to mishandling of carcasses, careless and bad flaying and defective curing.

The carcass is very useful and valuable to the national economy as all its components can be converted into articles of use. Organized carcass recovery centres in villages can give employment to a considerable number of rural population and save to the national economy a great deal of what is now wasted.

Components of a Carcass and its uses :

From a dead cattle (buffalo) on an average we get the following components, subject to the condition of the carcass :

Particulars	Weight (approximate)	Price (approximate)
1. Hide	40 lbs. to 100 lbs.	Rs. 15 to Rs. 40
2. Flesh	300 lbs. to 400 lbs.	Rs. 5 to Rs. 6 after conversion into meat-meal
3. Bones	60 lbs. to 80 lbs.	Rs. 5 to Rs. 6 after digestion of bones
4. Intestine, waste and guts	100 lbs. to 150 lbs.	Re. 0.75 to Re. 1
5. Dung	50 lbs. to 80 lbs.	Re. 0.19 to Re. 0.25
6. Tallow	10 lbs. to 30 lbs.	Rs. 5 to Rs. 15
7. Horns & hoofs	3 lbs. to 5 lbs.	Re. 0.19 to Re. 0.25

i) Hide : The hide of the dead animal is removed, cured and preserved after which it is converted into leather either as a consumer commodity or for industrial or agricultural purposes.

ii) Flesh : Flesh is a very important part of the carcass and if saved, can be converted into meat-meal which works out at 30 to 40 lbs. for a big carcass. This can be utilized as manure by agriculturists. The manurial value of this meat-meal may be gauged from the following analysis:

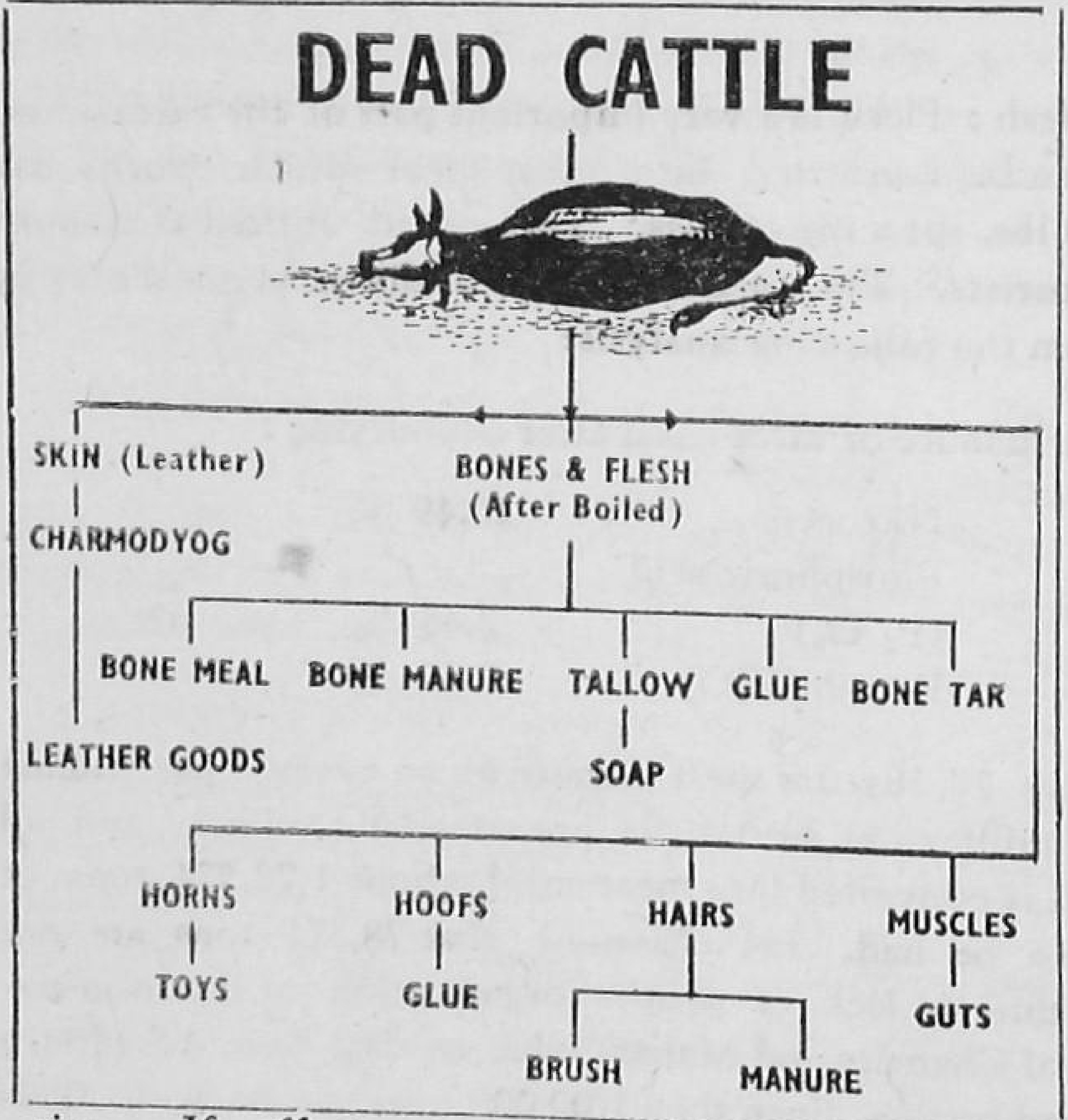
Flesh manure or meat-meal after ovendrying :

Nitrogen	10.49 %
Phosphoric acid (P_2O_5)	2.45 %
Potash (K_2O)	0.45 %

Taking 20 lbs. dry meat manure on an average per animal and if 20 millions of dead cattle are attended to timely and all their flesh is converted into meat-meal, about 1,78,571 tons of manure can be had. Let us assume that 78,571 tons are not available due to lack of proper organization or the non-co-operation of Chamars and Mahars who to-day have hereditary right to dead cattle. Even then 1,00,000 tons can be had. This will bring in an additional income of Rs. 2,80,00,000 per year. If the flesh is cooked under controlled temperature on ovens and sterilized, it can be used as fodder for chicken, pigs, zoo animals etc. If used in gas plants, it gives the required gases for lighting and cooking and can produce power to run small cottage industrial units. The digested flesh from the gas plant contains nitrogen and can be used as good manure.

iii) Bones: Bones can be cooked and digested in a bone-digester under pressure and can easily be powdered to make rich phosphate bone-meal. During the process of digestion, glue

water and tallow can be extracted as by-products. Finished marketable glue can be prepared from the glue water by further indirect heating. Five lakhs of tons of bones can be made available every year. The quantity collected and utilized at present does not exceed 1,50,000 tons in any year. Most of the raw bones remain unutilized today, because the trade does not find it economical to collect them from the distant villages of the interior. If efforts are made to collect the bones at a central place from the surrounding villages where flaying or carcass recovery centres are established and bones are cooked and digested, good use can be made of the raw bones. Besides, this will provide employment to a large number of persons who are not at present employed in the leather industry. Bone-meal prepared out of the digested bones contains:



Loss of ignition	26.90 %
Total nitrogen	2.38 %
Total P_2O_5	27.40 %
Citric acid (Soluble) P_2O_5	23.80 %

iv) Intensive Waste and Guts (Putha): If intestine and guts (putha) are recovered in good condition from the carcass, guts can be manufactured for tennis and badminton rackets, carding bows, etc.

v) Dung: Dung out of the carcass can be used as manure after being taken out or after being dried in the sun.

vi) Tallow: If the carcass is found healthy, 5 lbs. to 50 lbs. of tallow for carcass can be obtained, depending on the condition of the animal at the time of its death. Tallow can be used in the manufacture of soap, as a lubricant in leather industry and in the textile industry.

vii) Horns and Hoofs: Horns and hoofs can be used in making fancy toys, combs, spectacle frames, handles for knives, buttons, etc.

With a view to promote efficient carcass recovery work and to encourage the development of the Village Leather Industry, the Khadi and Village Industries Commission has formulated programmes which come broadly under the following heads:

a) Village Demonstration Parties,

b) Flaying Centres,

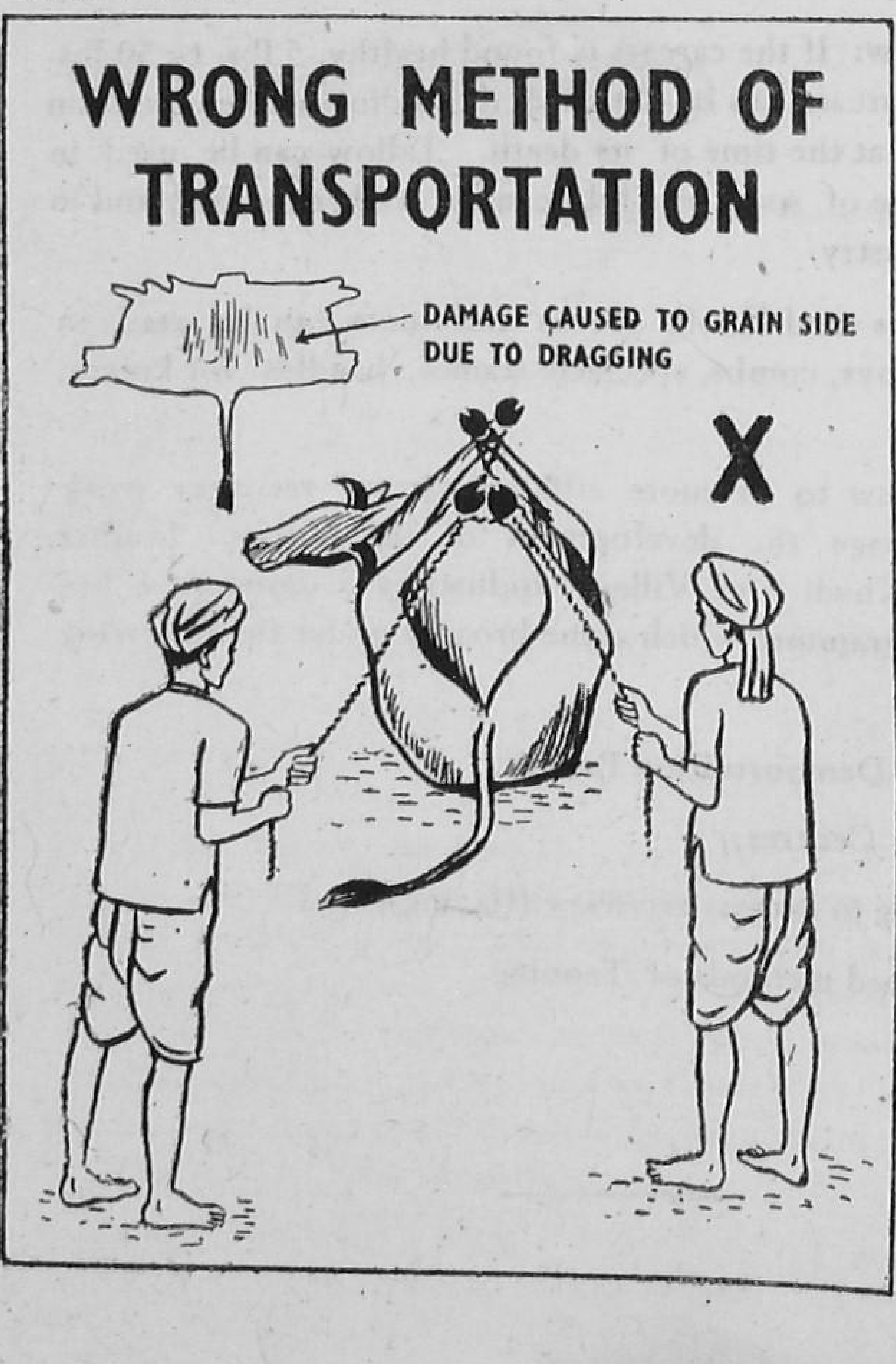
c) Training in carcass recovery (flaying), and

d) Improved methods of Tanning.

CHAPTER II

FLAYING OF "FALLEN" ANIMALS

"Fallen" hides are those flayed from the carcasses of animals which have died naturally, in most cases from starvation, disease or drought. In such cases the flayer is often faced with the problem of flaying in difficult surroundings and without the usual facilities.



"Fallen" hides are often of inferior quality, owing to poor flaying, the use of unsuitable knives, and the state of the carcass, which, not having been bled is full of blood. Particularly the side on which the carcass lay would be poor, being stained or dis-

coloured and liable to putrefaction due to the coagulated blood remaining in the small capillaries of the hide. Furthermore, the subcutaneous tissues would be harder, resulting in knife cuts, scores and gouges. In addition, the hide is usually thin and of poor substance owing to disease or starvation.

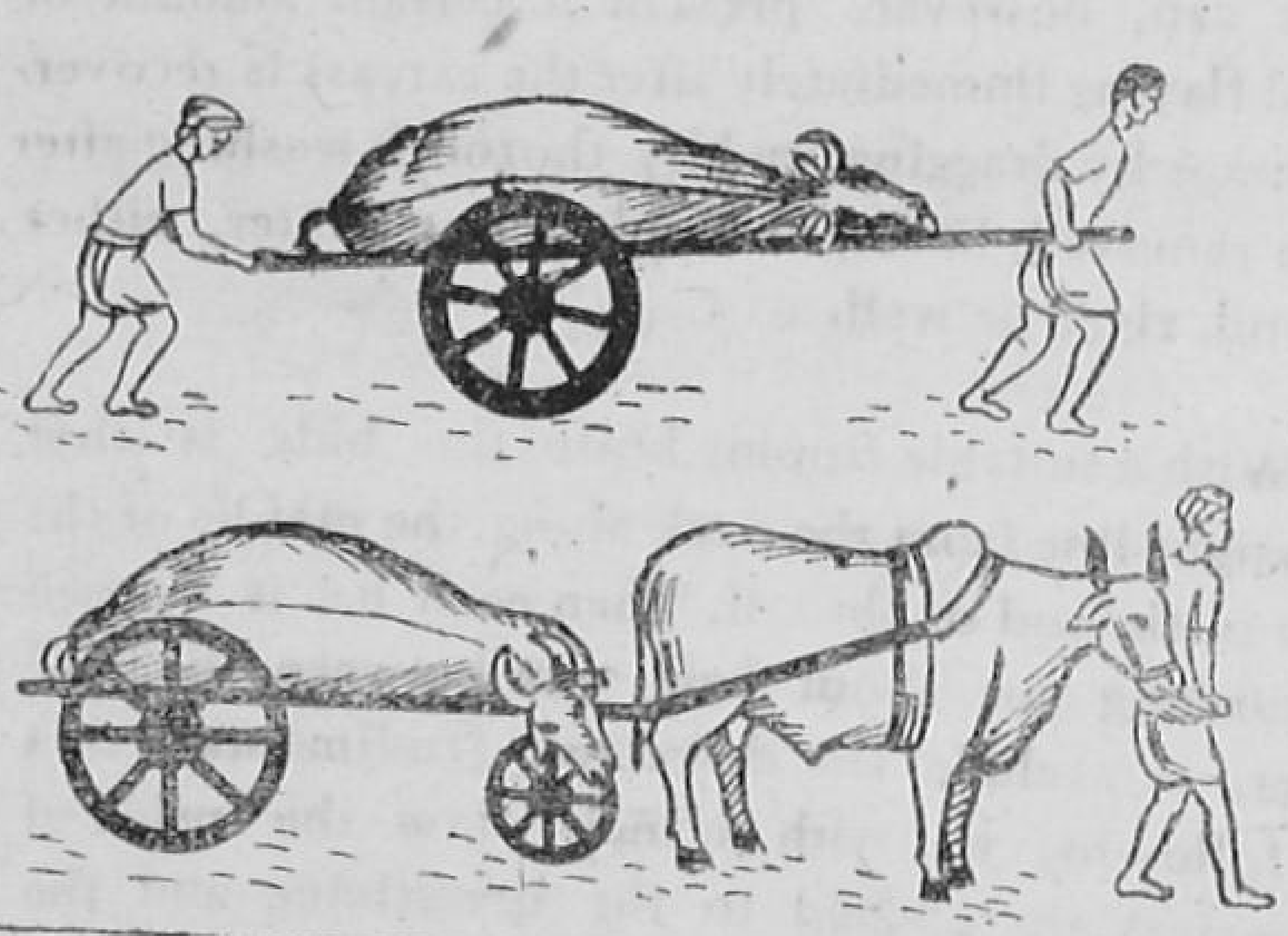
The flayer can, however, prevent a certain amount of damage by careful flaying immediately after the carcass is recovered, avoiding damage by dragging, and by thorough washing after the hide has been removed, in any available clean water, either piped or from pond, river or well.

Flaying : With a suitable ripping knife the hide is first opened in a straight line from the neck along the middle of the dewlap and belly to the end of the tail. Then each leg is opened by making an encircling cut about half way between the hoof and the knee joint, to exclude the dewclaws (rudimentary toes in cattle), and following up with an incision on the inside of each leg. The forelegs are opened to the breastbone and the hind legs with a curved incision to a point about midway between the anus and scrotum or udder, after which the tail is opened down the underside to the "switch" and the end tail bones exposed.

These instructions, if followed carefully, will produce a hide of regular shape with rounded rumps, an equal distance between each belly edge and the centre line of the back of medium length in the shanks, and with regular dewlaps and a generally square outline.

The hide is then separated from the carcass by cutting from the lower part of the breast towards the neck, and then from the lower part of the breast towards the navel, where the red meat of the sides becomes visible.

CORRECT WAYS OF CARCASS TRANSPORTATION



The flaying of the breast towards the neck should be carried out very carefully, in order that only the connecting tissues are severed, and leaving as much meat and fat as possible is left on the carcass.

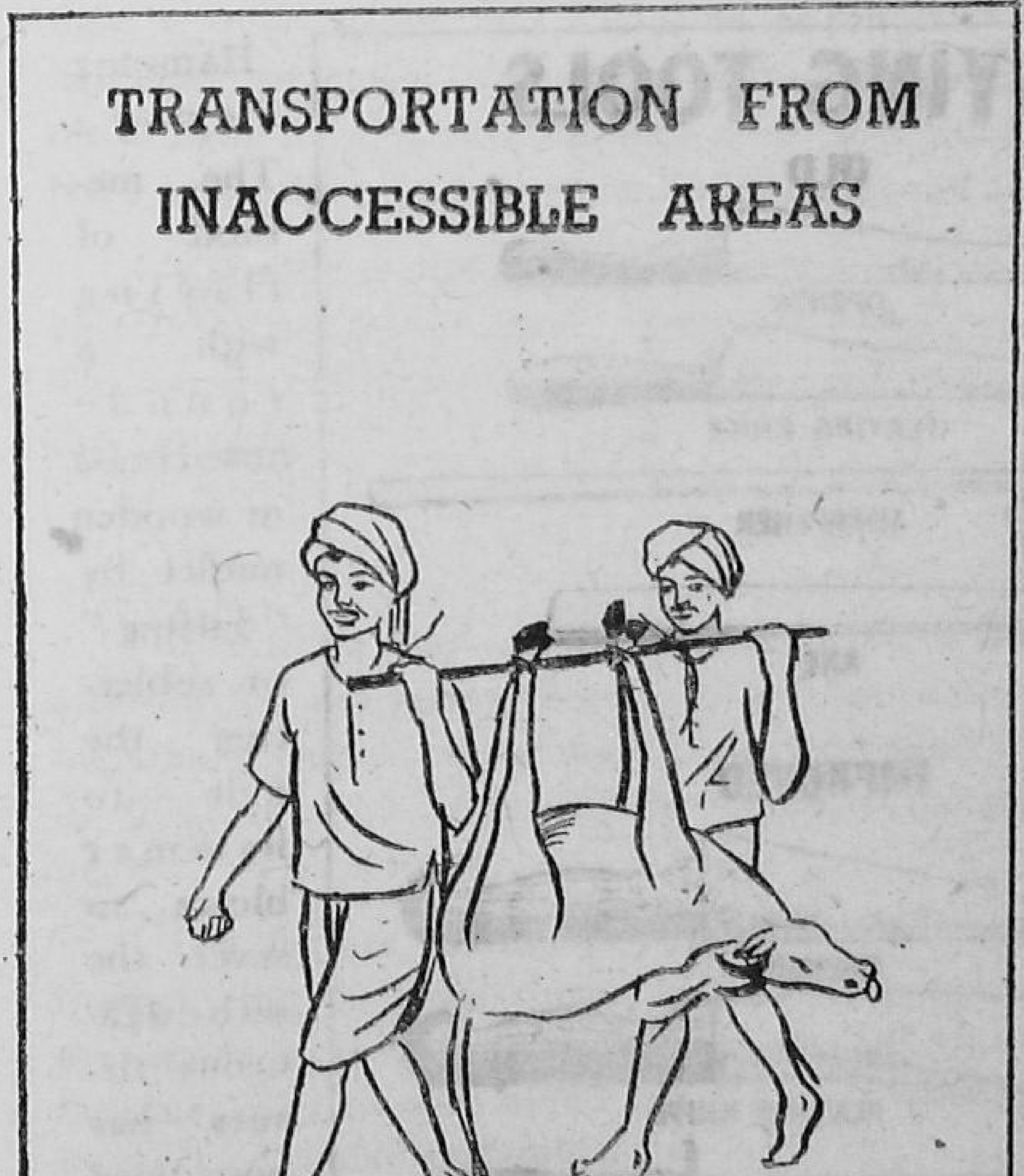
In the next phase of flaying the four legs are brought together —the left foreleg brought towards the left hind leg, and so on, to facilitate further flaying.

The shoulders are flayed partly by pulling and partly by careful use of the knife.

The sides are flayed out, starting from the foreshank downwards, or from the navel towards the foreshank. By stretching the hide outwards, the flaying of the sides is facilitated, and special care should be taken that the red meat covering the ribs remains on the carcass.

The flaying of the sides continues with long regular strokes until the so-called "red meat" ends. At this stage, unless hois-

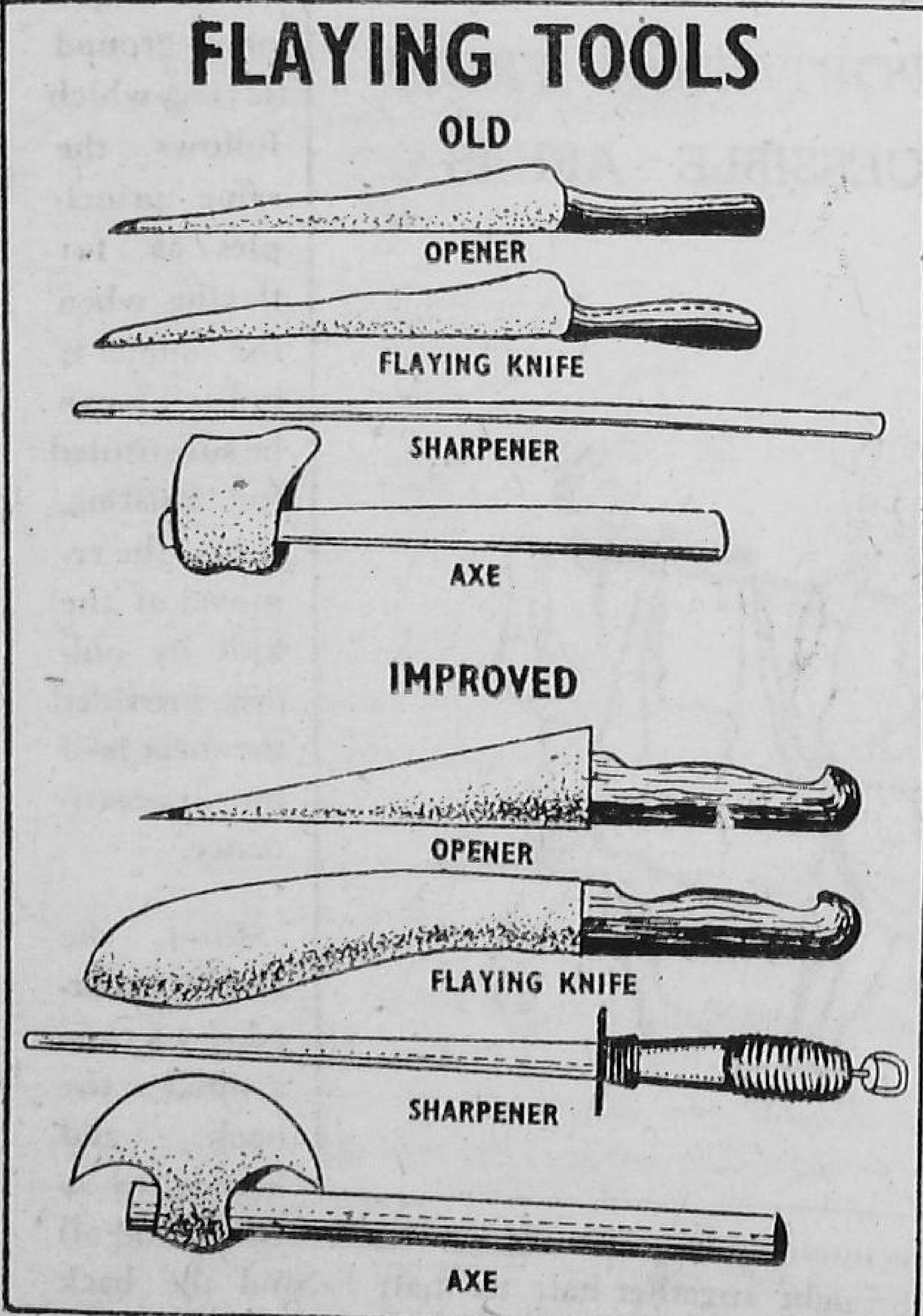
ting cannot be effected, no further removal should be attempted, while the carcass is still on the floor. To attempt to remove any part of the hide which is on the lower half of the prone carcass, i. e., by cutting underneath, would invariably result in cuts and gouges.



A technique of ground flaying, which follows the same principles as for flaying when the animal is hoisted, can be substituted for hoisting, i. e., the removal of the hide by pulling, provided the meat is of no consequence.

First, the head is secured, by a rope around the neck and horns, to a tree or anything immovable, after which both bellies and all four shanks are brought together hair to hair behind the back of the carcass which is resting on its side.

After flaying round the neck, the hide is then removed from the shoulder and hump with the knife, leaving the remainder to be pulled off the back to the end o' the tail, by a simple "tug o' war" action. Field experience has shown that the value of the "fallen" hide can be increased considerably. Flaying demonstration centres are necessary, therefore, to disseminate information on the procedures.



Hammer Flaying :- The method of flaying with a round-nosed brass or wooden mullet by " biffing " or subjecting the hide to hammer blows to sever the subcutaneous tissues has been tried with advantage. This method produces faultless flaying

and substitutes knife flaying completely. Two important factors, however, have to be taken into account. First, the hide must still be ripped, and part of the bellies and the lower part of the legs flayed with a knife. Second, the flayer must exert himself far more when using the hammer.

However, this type of flaying can be introduced only where there is supervision and discipline, as too heavy blows with the hammer can cause disruption of the fibres and grain surface, resulting in poor quality leather. Normally hammer flayed hides fetch a premium, except when knife marks and cuts are apparent.

A similar technique is that of hand-fisting or pulling particularly in the case of small animals - calves, goats and sheep. The handle of the knife, can also be used very effectively for this purpose.

2

Washing: Washing should be completed as soon as possible after flaying and before blood coagulation sets in either by immersing in water, or, preferably, by spreading out on large table or floor in order to clean with running water and a scrubbing brush.

The former method is suitable when the water supply is limited, but agitation during immersion is most essential, and the water should, if possible, be changed frequently as it soon becomes dirtied with blood and dung. Washing with running water is of course preferable.

Meating and Fatting ("After-cleaning")

The term "after-cleaning" is used for the operations in which superfluous fat or flesh is removed. Often superfluous fat or flesh adheres on the hide, mostly on the parts that covered the ribs and shoulders, with fat particularly around the tail area.

Whenever possible, this operation should be avoided, as the risk of gouging, scoring and cutting is very great.

Removal of this excess matter should be carried out as soon as possible after washing. To prevent damage in removing gross lumps, the operation should be done on a flat smooth table and not when the hide is suspended in frames. A very sharp and curved-edged knife should be used. Care should be taken not to flesh the hide too closely. It is advisable to leave some tissue or flesh on the hide rather than to damage the hide by trying to remove every small piece.

Trimming : Properly fleshed hides must be trimmed before they are dried. This means that all sharp, irregular flaps on the edge of the hide and all excessively long shanks should be removed. Re-trimming is sometimes necessary after drying to improve the shape of the hide.

Other Considerations : The removal of stomach and intestine should always be done after flaying is completed, to avoid the risk of the hide being fouled. The practice of cutting up all the meat and heaping it on to the hide, which is spread out on the ground, should be strongly condemned.

Note : In villages, animals die in fields and jungles far away from human habitation. It is, therefore, difficult to bring them to the flaying centre, especially during the rainy season when carts cannot be moved due to mud and mire on cart tracks. In such places the carcasses should be flayed on the spot where the animals die and the hides and skins should be brought after washing to the flaying centre and salted for proper preservation there. The other remains of the carcass such as horns, hoofs, bones and puttas should also be collected afterwards and brought to the centre for further processing. The main function of the flaying centre is to improve the quality of the hides and skins in the area of production. This can be achieved by paying a

premium price for the hides and skins that have been properly flayed and preserved.

3

PRODUCTION OF SKINS

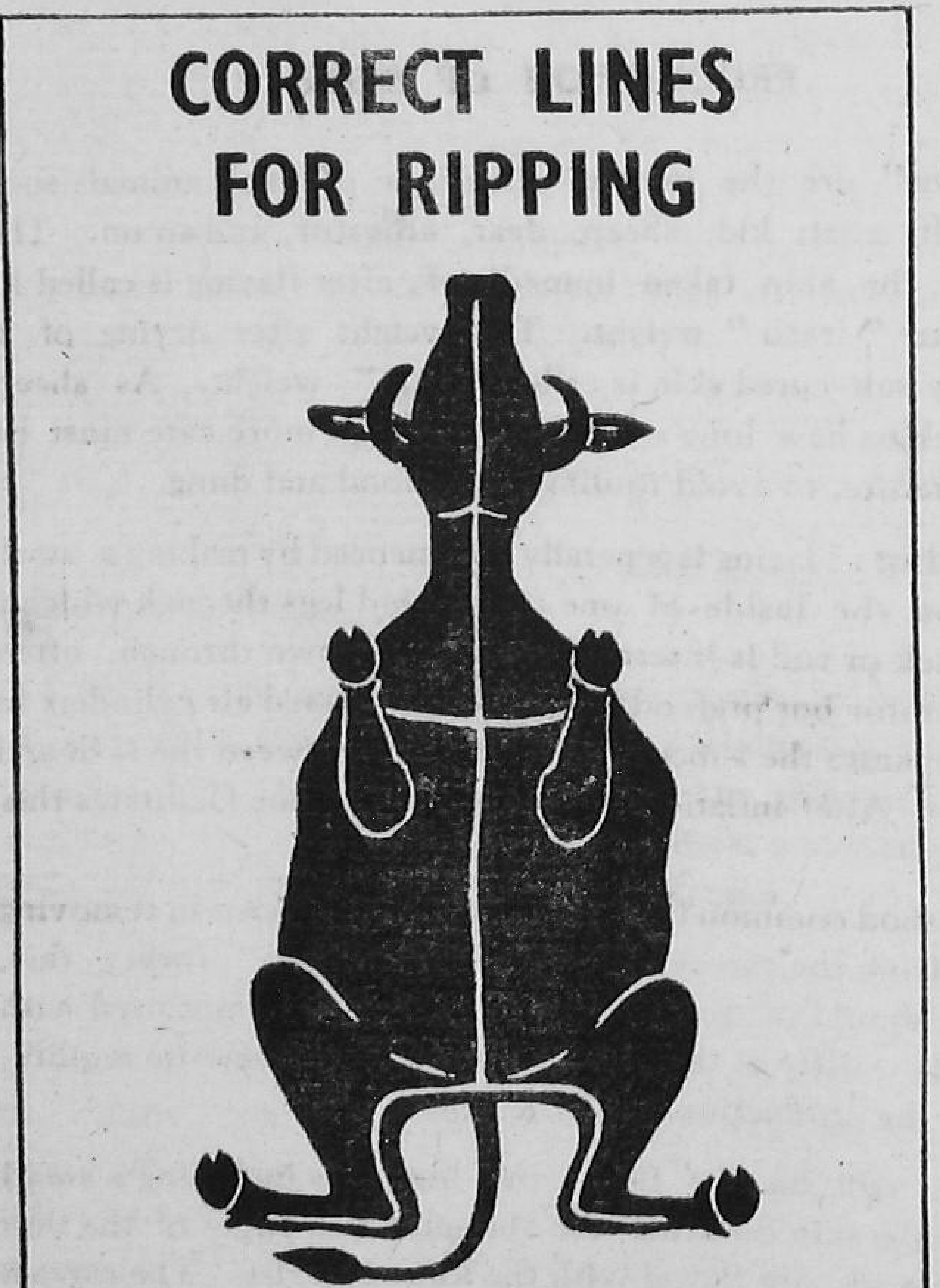
"Skins" are the integral coverings of small animals such as the calf, goat, kid, sheep, dear, alligator, and so on. The weight of the skin taken immediatefy after flaying is called its "green" or "fresh" weight. The weight after drying of a thoroughly salt-cured skin is called "salt" weight. As sheep and goat skins have long wool or hair, much more care must be taken, therefore, to avoid fouling with blood and dung.

Flaying : Flaying is generally commenced by making a small incision on the inside of one of the hind legs through which a nozzle, stick or rod is inserted, air is then blown through, often by the operator but preferably from compressed air cylinders in order to separate the subcutaneous tissues between the skin and the carcass. After inflation, vigorous pummeling facilitates this separation.

A method common in various countries consists in removing the skin from the carcass in the so-called "case" form; this, preferably, should be done by hand-pulling. It is not used with a view to the quality of the skin, but to satisfy a domestic requirement, viz., the production of water-skins.

While still on the floor, the hind legs including a small portion of the skin covering the abdomen and edges of the butt round the rump, are flayed with the knife and fist. The carcass is then suspended by the hind legs and the skin peeled off by pulling and further fisting. In the final phase the flayer uses the weight of his foot with downward pressure to remove the skin from the neck and forelegs.

Another common method of flaying following inflation is similar to that used for hides. The carcass is ripped down the centre of the belly and on the inside of each leg ; the foreleg incisions join the centre incision at the breast and the hind leg incisions follow the line of the rump to the anus. The bellies and legs are then flayed while the carcass is on the floor.



Washing: This is an undesirable practice when dealing with long woolled or haired sheep-skin and long-haired goats, owing to the excessive quantity of moisture held in the wool, hair and the corium itself. The presence of excess water in the corium will cause a weakness in fibre structure if the skin is dried at high temperatures. The danger point in

..rying skins containing too much water occurs where the temperature reaches 60° C (140° F), which is called the shrinkage temperature. At this stage a change in the molecular structure of the fibre occurs, which results in disintegration when the skins are subjected to water or lime solution. In tropical countries drying at extremely high temperatures is quite common, but should be avoided whenever possible.

Fatting: The fatty tissues remaining on the flesh of skins, and sheep skins in particular, are a source of damage which is sometimes quite disastrous if cleaning and fatting is neglected. During air drying the grease is absorbed by the skin, and is most difficult to remove in subsequent tannery processes, invariably causing greasy stains, which will not take the dye. Also, the penetration of brine during the salt curing process will be retarded, resulting in insufficient curing in addition to grease stains. The fat can be removed satisfactorily by suspending the skin from a wall hook by the neck and cleaning the flesh, using a scraping action rather than cutting with a sharp curved-edged knife.

It is not possible to clean wool or hair sheep skins or long haired goat skins by placing on a flat surface owing to the irregular and lumpy cushion production by the hair and wool.

CHAPTER III

CURING OF HIDES AND SKINS

1

Hides and skins, in the condition in which they are removed from the carcass, are subject, particularly in hot climates, to rapid putrefaction, as they are then very liable to attack by many types of bacteria and mould. Dust, dirt, soil, water, etc. act as continuous sources of infection, quite apart from the transmission of micro-organisms by air, insects, or contact with diseased animals. A freshly flayed hide or skin contains natural moisture to the extent of 60 per cent of its weight. As examples, a hide of 50 lbs. contains 30 lbs. of water, and a goat-skin of 5 lbs. contains 3 lbs. It follows, therefore, that if a hide or skin is left uncured, the combination of water and bacteria will cause putrefaction at a rate dependent upon the temperature. Under tropical conditions, say 38° C (100°F), a skin will begin to smell within 12 hours, if kept damp, as putrefaction is speeded by the combined effect of moisture and warmth. A skin will remain sweet if stored moist and cold, or if stored dry and warm.

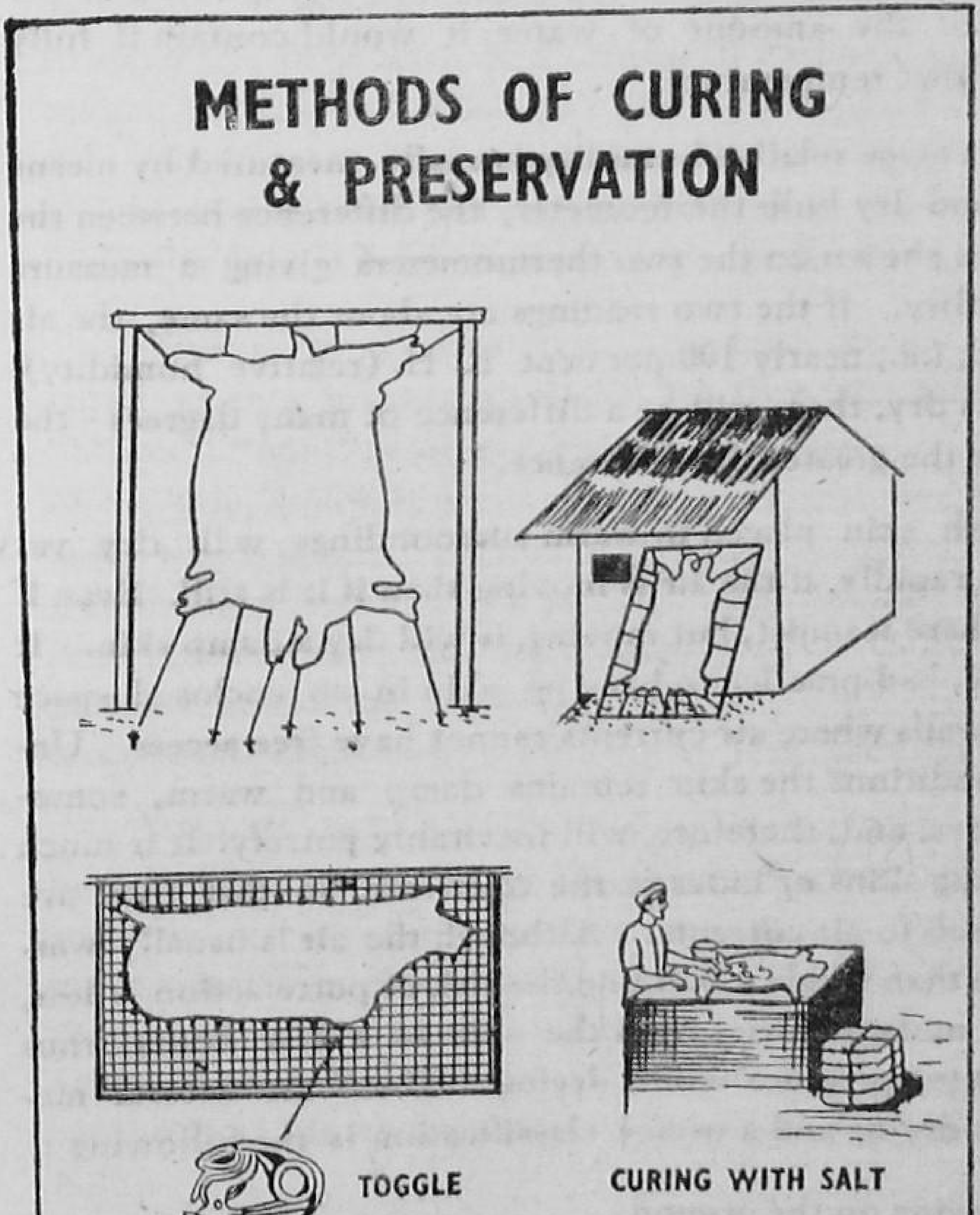
Action must be taken, therefore, to prevent putrefaction and to bring the hides and skins into a suitable condition for transport and storage. This action is referred to as preservation or curing. The value of hides, skins, when cured according to the systems described below, is greatly increased.

There are three main methods in general use:

(a) Air-drying

(b) Salt-curing

(c) Pickling



In warm or hot climates, delay between the flaying and curing of a hide or skin will lead to deterioration. The ideal is for this period not to exceed 3 to 4 hours, which is possible in places where only a few hides or skins are handled per day. Hides and skins should not be conveyed in open carts fully exposed to the hot sun, nor should they be kept rolled in the unsalted condition and exposed to the sun all day.

Air-Drying: In areas where the atmosphere is dry, skins of the sheep and goat can be dried in three hours or less. The dryness of the air can be expressed in figures, and the unit usually adopted is the "percentage relative humidity" i. e., the amount of moisture in the air at a certain temperature, expressed as the percentage of the amount of water it would contain if fully saturated at that temperature.

The percentage relative humidity is easily measured by means of the wet and dry bulb thermometer, the difference between the temperatures shown on the two thermometers giving a measure of the humidity. If the two readings are about the same, the air is saturated, i.e., nearly 100 per cent R. H. (relative humidity). If the air is dry, there will be a difference of many degrees – the drier the air the greater the difference.

A fresh skin placed in warm surroundings will dry very much more rapidly, if the air is moving than if it is still. Even if the atmosphere is moist, but moving, it will dry a damp skin. It is, therefore, bad practice to hang up skin in an enclosed space with solid walls where air currents cannot have free access. Under such conditions the skin remains damp and warm, sometimes for days, and, therefore, will inevitably putrefy. It is much better to hang skins or hides in the open air, so that they are freely exposed to air currents. Although the air is usually warmer outside than inside a building, the risk of putrefaction is less, because the moisture dries from the skin in a few hours, thus lowering its temperature while drying. There are several methods of air drying and a useful classification is the following :

(a) Drying on the ground

(b) Drying by suspension (frame-drying)

(c) Drying by suspension over cords or wires (line-drying)

(d) Tent – and parasol – drying

Curing by drying alone has only one danger. When the dried skin or hide has been stored for a few weeks, it is likely to be attacked by beetles, moths or other insects, which do not attack dry-salted skins. Therefore, special precautions have to be taken. A method which has been in use for many years is to spray the skins with or dip them in a solution of sodium arsenite. The method consists of placing them on the ground flesh side uppermost tó dry in the sun. As the hide in drying would wrinkle and shrivel, it is pegged down to the ground to keep it fairly flat or it is held in place by stones placed at the ends.

This method gives very unsatisfactory results and hides cured in this manner are liable to show the defects known as "blister", "taint", rottenness beween the inner and outer surfaces of the hide, which is often not detectable until the hide is soaked again when tanning begins, and which results in damage that completely penetrates the leather. The deteriorated or solubilized portions are dissolved, giving rise in the milder form to loss of grain, and in the advanced form to holes in the hide. In the more severe cases, large areas of the hide disappear completely.

"Taint" and "Hairslip" represent relatively mild forms of putrefactive damage, which affect the surface of the hide and skin and may occur on either the grain side or the flesh side, resulting in superficial damage to leather. "Hairslip" is but an indication of putrefactive damage to the grain surface, which has so loosened that the hair rubs off easily. These types of damage are attributable to restricted and retarded drying as explained below.

When a hide or skin is spread flat on the ground, flesh side uppermost, the moisture cannot escape from the hair side. The flesh side, being submitted to the sun's rays, will become hotter, and therefore, stew instead of dry, resulting in putrefaction. Therefore, free circulation of air on both sides of the hide

or skin is essential to dry satisfactorily, The conclusion is that ground drying has to be condemned and the "suspension method", providing free circulation of air, as described below, should be propagated.

Drying by Suspension (frame-drying) : The equipment used in suspension-drying consists of horizontal poles erected at a suitable distance from the ground, 5 ft. or more, according to the size of the hides. The poles should be in a line running east and west and the hides should be suspended clear of the ground, by tying the tail butt and hind shanks to the poles with ropes, and then tying the head and force-shanks to pegs in the ground. It is important that the lower ends of the hides do not touch the ground. The pegs are placed on the line of the shadow thrown by the horizontal poles at midday.

The hide is thus stretched at an angle with the ground, flesh side uppermost. In this manner, the hide will be freely exposed on both sides for drying.

Drying by Suspension over Gords or Wires (line-drying) : In areas where wood for frames is scarce, the line-drying method can be used. The skin is suspended symmetrically along the backbone with hair or wool hanging down, over a cord, or wire, not thicker than one's little finger. The two bellies and flanks must be prevented from touching each other,and the shanks from folding inwards, by using pieces of stick or straws which will adhere to the wet flesh, so that every part of the skin is freely open to the air. Drying of the skins may be completed in three hours or more, depending on the velocity and humidity of the air which circulates. The progress during drying of goat skins can easily be checked by smell; if the hair side smells of goat all is well. If the skin or hide is dried by suspension over a thick pole, it will putrefy along the line of the pole because a fairly wide band of the skin or hide is in close contact with the

pole, thus drying more slowly than if in contact with thin cord or wire.

Tent and Parasol-drying : Wood not being available in the desert, and salt scarce and expensive, sun-drying can be practised to advantage. In principle this method does not differ essentially from drying over thin poles or wires.

Another practice, "tent-drying," consists in supporting the backbone of the skin on a wire stretched between two posts at about 3 ft. from the ground, and stretching the edges of the skin or hide by cords to pegs in the ground along each side.

The "parasol" or "umbrella" method involves a single central vertical pole to support the middle of the hide, with the edges stretched out to pegs in the ground.

2

SELF-CURING

In areas where the atmosphere has a relative humidity of over 90 per cent, which, in west monsoon periods, is fairly often the case, it is possible to dry skins effectively because the rate of drying is slow, and after a day or two the damp warm skin would begin to putrefy.

Even if the percentage of relative humidity is as low as 80, (and skins would dry eventually in the presence of rapid air circulation), putrefaction is very liable to develop during the long period when the skin is drying. The same is even more true for hides, as they take longer to dry than skins due to the fact that a fresh hide weighs more and is thicker. In such cases, therefore, salting is a more appropriate method. Curing by salting is broadly divided into two methods :

(a) Dry-salting
(b) Wet-salting

Dry-salting with Common Commercial Salt : If a fresh skin is sprinkled with common commercial dry salt, a few minutes contact will show that the salt becomes wet and is absorbed by the water in a fresh skin. The application of salt has two purposes ; it removes water from the hide or skin, and at the same time it delays putrefaction.

Time must be allowed for the external salt to reach the interior of the skin and still more to reach the interior of the hide. Solid salt will completely penetrate a fresh skin or even hide in a few hours, but in practice it is safer to allow longer. The more salt is sprinkled on, up to a certain proportion compared to the weight of a fresh hide or skin, the quicker will it penetrate the skin. Above this proportion salt is wasted, and nothing is gained. For the skins of a calf, goat or sheep, 40 to 50 per cent of the weight of the skin is a reasonable figure. For heavy hides, salt to about 30 to 40 per cent of the weight of the hide is adequate.

In the dry-salting method suitable for dry climates the best way to start salting action is to wash the flesh side of the skin with clean water. The hair or wool side is not washed, as it would retain too much water.

The next step is as follows : the skin, after being well drained, is laid flesh up on a gently sloping even floor on wooden slats to allow for further drainage, or on a rack and then spread evenly with half its weight of dry common commercial salt, with the edges turned in slightly to prevent the salt falling off.

On this, a second skin is laid, flesh up similarly spread, and then a third and so on, till the pile is of suitable height. The pile is left for one to two days and in some areas for three to four days, after which the skins are shaken free of wet salt. In this partly dehydrated condition the skins are fully dried in the sun, suspended over a wire or a cord.

Sheep and goatskins are often subjected to a bad practice, being folded in the salted state and placed in a pit two to three weeks, during which time the pit becomes filled with the liquid which seeps out of the skins. They are then removed, drained overnight under cover and dried on the ground in the sun. When these skins are removed from the pit, they are characterized by a strong putrid smell so that it is not surprising that this method has been found to produce leather of inferior quality. In hot weather it may result in the destruction of the skins by their breaking into pieces.

The secret of good curing in hot climates is to remove the water from the skin in as short a time as possible. It is, therefore, advisable to avoid even a superficial wash, to avoid adding water to the curing salt, and to avoid keeping skins in a wet condition for many days.

Washing is permissible, even necessary, if skins have begun to dry as a result of exposure to a strong dry wind, say 10 per cent relative humidity or less. This may cause such skins quickly to form a sheath of dry tissue on the flesh side, within an hour of being flayed. If dry salt is placed on the dry surface of such a skin, the water inside it cannot diffuse into the salt, nor can the salt enter the skin. In such a case, it is necessary to wash the flesh of the skin so as to soften it, but it should be well-drained before applying the salt. The skin should then be left in a pile for one to two days and dried.

Even when skins are left fully salted but wet for only six days, they are liable to deterioration if the atmosphere temperature range is 30°C to 42°C (86° to 108°F). These conditions tend to produce skins easily torn when dried and liable to go to pieces in soaking and liming.

These results are avoided when the time in the salted but wet condition is restricted to one or two days. If at this stage

the salt on the skins is actually in solution and has disappeared, and the skins are still wet due to insufficient draining after washing, a second salting should be given. When skins feel "cheesy" after salting, they will dry off rapidly and suffer no harm even if exposed obliquely to the rays of the sun during the drying off from the semi-dry condition.

Dry-salting of hides is done in a way similar to that of skins. They are salted in piles, flesh up, on a wooden rack and the salt is used to an extent of about one third of the hide weight.

Racks on the floor are necessary to avoid the bottom hide being fouled by a mixture of blood and brine which drips away.

The pack of, say, 40 hides is left for three or four days, re-salted if necessary for another two or three days and dried as rapidly as possible.

When draining has ceased, the hides may be re-piled flesh up on two racks. Finally, the hides are either dried by suspension or laid on the ground in the early morning or evening sun, or in the shade either at once, or after a second salting. In practice, framing salted hides is very uncommon. In order to "condition" for folding, each hide should be laid out flat in the morning or evening sun or shade, until the minimum moisture content necessary to permit folding by the correct method is reached. This condition is necessary in order to fold and ventilate without the risk of decomposition by the overheating of the unexposed and folded portion.

Dry-salting with Common Commercial Salt: Dry-salting with common commercial salt in a climate which is continuously humid is unlikely to be satisfactory, because, when the humidity of the air is above 75 per cent. common commercial salt becomes increasingly damp until it actually forms a solution with the water absorbed by it.

Dry-salted skins, stored in a humid climate, are thus liable to lose salt by its dripping out of the skin as a solution, and hides and skins which have been salted in a persistently damp climate cannot remain dry during storage.

In some areas, particularly in Bengal, this difficulty is to some extent met by using mixture of common commercial salt and anhydrous sodium sulphate, in the proportion of one to five. As sodium sulphate without water of crystallization can absorb a great amount of water, it is more suitable for curing in a damp climate. After the above treatment the skins can be dried by one of the approved methods without any risk of putrefaction. However, in a drier climate, common commercial salt is better, because it is a more effective preservative.

Wet-salting with Common Commercial Salt: Wet-salting is better carried out in the same way as dry-salting, by piling the hides and skins on a clean wooden rack so that the pile is raised 2 to 3 inches above the floor to assist drainage. The final drying, as described for the dry-salting methods, is omitted. Skins should not be stored in the wet-salted condition in a warm atmosphere.

To counteract the damaging effects of salt-tolerant bacteria during wet-salting, various disinfectants should be added to the salt before use. The following materials have been found suitable for this purpose ; the proportions given are per 100 parts of salt weight :

Sodium fluoride	2 parts
Sodium silicofluoride	2 ,,
Sodium pentachlorophenate	0.2 ,,
Zinc chloride	0.5 ,,

Mixture of 2 parts soda ash and 1 part nephthalene

3

PICKLING

The preparation of pickled pelts involved two main operations - dehairing the skins, and treatment with salt and acid. Pickling is used in cases where it is convenient to unhair or dewool sheep skins locally and then handle the pelts as a separate article.

The skins are first dewoolled by treating the flesh side with a paint consisting of a strong condition of sodium sulphide into which slaked lime has been stirred until it is of a creamy consistency. The paint so treated adheres to the skin, which then swells and tightens by absorption of water; its water content rises to about 80%, as against 60% in the freshly flayed condition.

After painting, the skins are either folded down the backbone, flesh side inwards, or stacked flesh to flesh, for 24 hours, after which the wool is pulled. After dewoolling the pelts are washed, limed, delimed, bated and pickled. Deliming is done with a solution of ammonium chloride or sulphate. In the pickling operation the pelts are gently pushed ("paddled") round and round in the pickle solution of common commercial salt and sulphuric acid.

The proportion of salt in the solution should be about 12 per cent and the amount of sulphuric acid should be so adjusted that the final liquor, when the skins are removed, is about 0.01 normal (centinormal) or 0.5 percent, i. e. fully acid to the test paper or indicator Thymol Blue.

Handling should continue for at least 3 hours, and after leaving all night, a further hour's handling is given.

The skins are then removed, drained and packed. Pickled pelts should not be stored in any hot climate for much more than a year.

Notes On Common Commercial Curing Salt

Purity : Common commercial curing salt, as used in industry, in which the basic principle is sodium chloride (Na CI), varies greatly in purity, which may be almost 100%, or as low as 70% in the case of natural salts containing also earth, clay and other salts.

The impurities found in the better grade curing salts are sodium sulphate, and chlorides and sulphates of calcium and magnesium. Magnesium and calcium chlorides, being more hygroscopic than sodium chloride, would tend to keep salt wet if the climate is humid, and the salted hides would remain damp. They also tend to form soaps with the natural fats in the skins, and these would complicate any subsequent chrome-tanning process. The total calcium or magnesium salt content of commercial curing salt should not, therefore, exceed 1%.

Size of Grain : Coarse-grained salt is unsuitable for curing hides and skins, because the large grains absorb the water from them only slowly. It also causes dents and pits in the hide or skin, which are difficult to remove. Finally powdered salt, if stored in bulk, sets into a solid block in damp atmospheres, and requires re-grinding before use. The best size is about 2 to 3 mm.

Curing with Infected Salt : As salt can become infected with various bacteria during the curing process, it is obviously a bad practice to use it repeatedly. If, however, it is mixed with a disinfectant and is dry, it may with safety be used more than once. Mixing the salt with 2 per cent sodium sillicofluoride has been found to render it safe for re-use, and so treated it has no harmful effects on leather subsequently tanned with it.

CHAPTER IV

DAMAGE AND DEFECTS

Many kinds of damage reduce the value of hides and skins. The causes are several, and some of them are described below :

Branding : The extensive use of the hot iron for branding cattle, as a means of proving ownership, is perhaps in some countries the greatest single cause of damage while the animal is alive. The burn normally penetrates the hide or skin and is visible on the flesh side, rendering it quite useless to the tanner ; it is usually placed on the rump or back of the animal and quite often on the thigh. Animal owners should be taught to avoid branding on the most valuable parts of the hide, and to confine it to the hump, the lower parts of the legs, cheeks, pate, horns or hoofs.

Chemical branding substances are relatively inexpensive and quite easily applied. Normally, the branding iron is dipped in the fluid and then applied to the hair. A certain amount of care is necessary, however, as some chemicals cause damage.

Mechanical damage from cattle horns : This is a common source of hide damage amongst animals with horns, particularly in countries where types of the old "long horn" cattle prevail. The animals are damaged usually in the abdomen, forequarters or hindquarters. The injuries frequently are neglected, and give rise to bacterial and parasitical infection which, if neglected, cause a large-scale "sloughing" of the tissues with resultant scar tissue formation and deterioration of the hide.

Mange : Mange is a skin disease of which the commonest type is known as follicular or demodectic mange, and is caused by parasitic mites visible only under the microscope. It is

spread by contact with infected animals or enclosures, the mite living in the hair follicles and under the surface of the skin. After mating, the females move deeper into the skin to lay hundreds of eggs which, when mature, spread and do further damage.

The condition can be detected fairly easily by examining the flesh side of air-dried hides, noting the round "cheesy" yellow spots and the dried lesions in the hair. During the early tannery processes the "cheesy" mass is washed out leaving empty pockets, thus producing a pitted and scarred grain surface, and reducing the value of the leather cosiderably.

Scabies: There are several varieties of scabies, but they may be considered collectively. The mites multiply prolifically under the skin surface, and hides damaged thereby have a coarse grain, and lesion and scratch scars, so that they are totally unsuitable for the production of good quality leather.

Ticks: These blood-sucking parasites are usually found attached to the tender parts of the skin, thinner portions of the hide such as the dewlap, the inner parts of the thighs and under the elbow, where they feed. The damage takes the form of small, more or less heald scars, which mar the smoothness of the grain and detract from the appearance of the finished leather. Secondary infections lead to far more extensive damage.

Lice: Lesions caused by lice sear and damage the grain surface by the inflammation set up where the parasites have attached themselves.

Leeches: Leeches are aquatic sucking annelids which attach themselves in numbers to the skin of animals, particularly when they are watering. They concentrate near the surface of the water so that, when the animals are partially immersed in the watering pools, they attack in a more or less regular line around

the rumps and down the bellies, finishing near the forelegs; they make small punctures and give bruised appearance to the grain.

Warble Fly Larvae : The larvae of these insects (Hypoderma Bovis), which are wasp-like flies, attack cattle and do very considerable damage to hides during the final stages of larval development. The larvae, hatched from eggs deposited on the hairs of the legs, penetrate the body and, after undergoing a number of changes, finally reach the skin of the back. Here they become encysted, the cysts having a hole to the outer air so that the larvae can breathe. The larvae reach maturity in this position and then work their way, hind-end first, out of the back, and drop the ground in the pupa state to continue their life cycles.

A warble hole may in time heal over, forming a heavy scar. As many as six to seven hundred warble holes have been recorded in a single hide.

Treatment of the live cattle against the warble fly with e freshly prepared wash of derris root several times in a season is compulsory in a number of countries ; the larvae cause not only hide damage but also a reduction in milk yield and in body weight and therefore in the yield of meat.

Ringworm : This is a common disease caused by a fungus, and is spread by direct or indirect contact. The fungus attacks the hair and its roots causing circular inflammatory patches, later turning into scabs or secondary infections. The scars are clearly visible to the tanner, being shiny and circular in appearance.

Cow-Pox : The first symptoms of Cow-pox, and infectious disease, are small inflamed spots, usually on the under or tender parts of the skin. Later, blisterlike eruptions appear, and these become charged with pus. Apart from the damage caused by the lesions, further damage is self-inflicted by the urge of the

animal to rub the irritating parts on any rough object, causing further infection and damaged grain.

Rinderpest : This virus disease causes dark, scabrous discolorations, and the hides of animals dying from it are thin and light. No other lesions directly attributable to the disease itself are found on the hides, but the poor light hides yield thin sole leather with thin fibres and little resistance to abrasion. In addition, the thinness may make oil scars and blemishes more easily seen, while sores and abrasions may develop from struggles after animals have become too weak to stand.

Anthrax : Although the hides of animals dying from anthrax show no actual defects due to the disease itself, mention must be made of it. Whenever cattle die suddenly for no obvious reason, anthrax must be suspected, and a veterinary officer, whenever possible, should be called in. Flaying of an animal that has died from anthrax is never permitted. This disease causes sudden death, and all tissues of animals so affected contain spores of the anthrax bacillus which may infect anyone handling them, as anthrax spores remain viable for a long time.

Bruises: Unnecessarily hard beating of animals with sticks and ropes when driving them causes bruises on the meat and leads to blood extravasation in the hide or skin over the bruised area.

Rubbed or dragged grain : This damage is due to abrasion of the grain surface, usually the result of dragging the live animal or carcass over rough ground.

Overstretching and distortion : When hides and skins are laced to a frame for drying they should be under light tension just sufficient to stretch them to their normal shape. If they are too tightly laced to the frame, they come under great tension when they contract during drying, and this causes undue stret-

ching of the thinner portions and rupturing of fibres. Thus the leather produced will be of lower breaking strength and have a looser structure where the ruptures have occurred.

If the lacing rope is too tight in one direction only, the shape of the hide or skin will become distorted, and its value will correspondingly fall.

Folding : If hides and skins are folded down the line of the backbone as soon as they leave the drying-frames or wires, they apparently suffer little damage. If they are allowed to become flint dry before folding there is a danger that fibres will be reputed and cracks will develop in the leather as a result of the rupture of the grain.

Rubbing during transport : Hides and skins are often loaded singly or tied in loose bundles. Consequently, any movement will make the surfaces rub together and cause considerable damage, especially to the grain, folded edges and corners.

Wetting : The importance of protection against wetting by rain and floods and contamination by sea water during shipment cannot be overemphasized. If hides and skins are accidentally or, as in many cases, negligently wetted and not immediately dried out, bacterial action will set in again as a result of the loss of salt. In the case of air-dried hides or skins, wetting leads to even more active bacterial action. Pickled skins are also affected by the removal of the salt, which causes acid swelling. In all cases considerable fibre destruction takes place, resulting in serious losses. Such damage can be reduced considerably by ensuring that hide stores are constructed with rainproof roofs and floor drains and slopes to counteract any risk of flooding. All piles of hides and skins should also be kept clear of the floor by stacking on racks to raise the bottom hides at least four inches off the ground.

Vermin damage: Damage to the hides and skins in store is not generally excessive, but persistent attacks by gnawing rodents can reduce good hides and skins to a third grade, and even reject or glue-stock quality. Precautions against this damage would include keeping stores clean, periodical movement of stocks, and the use of poisons, traps and cats.

Insect damage: By far the most serious damage to which hides and skins are exposed during storage and transport, and especially so in areas where excessive humidity and heavy rains are common, is that done by insects. The most destructive of these is of the beetle family.

White ants also cause considerable damage, forming their characteristic "lanes" throughout the bottom hides of a stack

and gradually creeping up through the pile.

It is recommended that insecticides be used to counteract this danger ; it is essential, however, that they be applied correctly and, in the case of liquids, in sufficiently strong concentrations.

Powders, to be most effective, should be spread evenly over the hair side and well rubbed in by hand.

Recently, preservation of dried hides or skins against attacks of beetles, moths and other insects, has been successfully achieved by spraying with a 5 per cent suspension of sodium silicofluoride, using about 4.5 liters (1 gallon) for 50 skins or 10 to 15 hides.

CHAPTER V

VILLAGE TANNING

Leather tanning is known in India from very early times. Tanning is a chemical process which turns hides and skins which are nitrogenous and putrefiable, to unputrefiable substances and gives to them the properties of softness and pliability. The skins of the big animals like the buffalo, cow, horse, camel etc., are known as "hides" and of smaller animals like buffalo and cow calves, goat, sheep, deer, tiger, etc., are known as "skins."

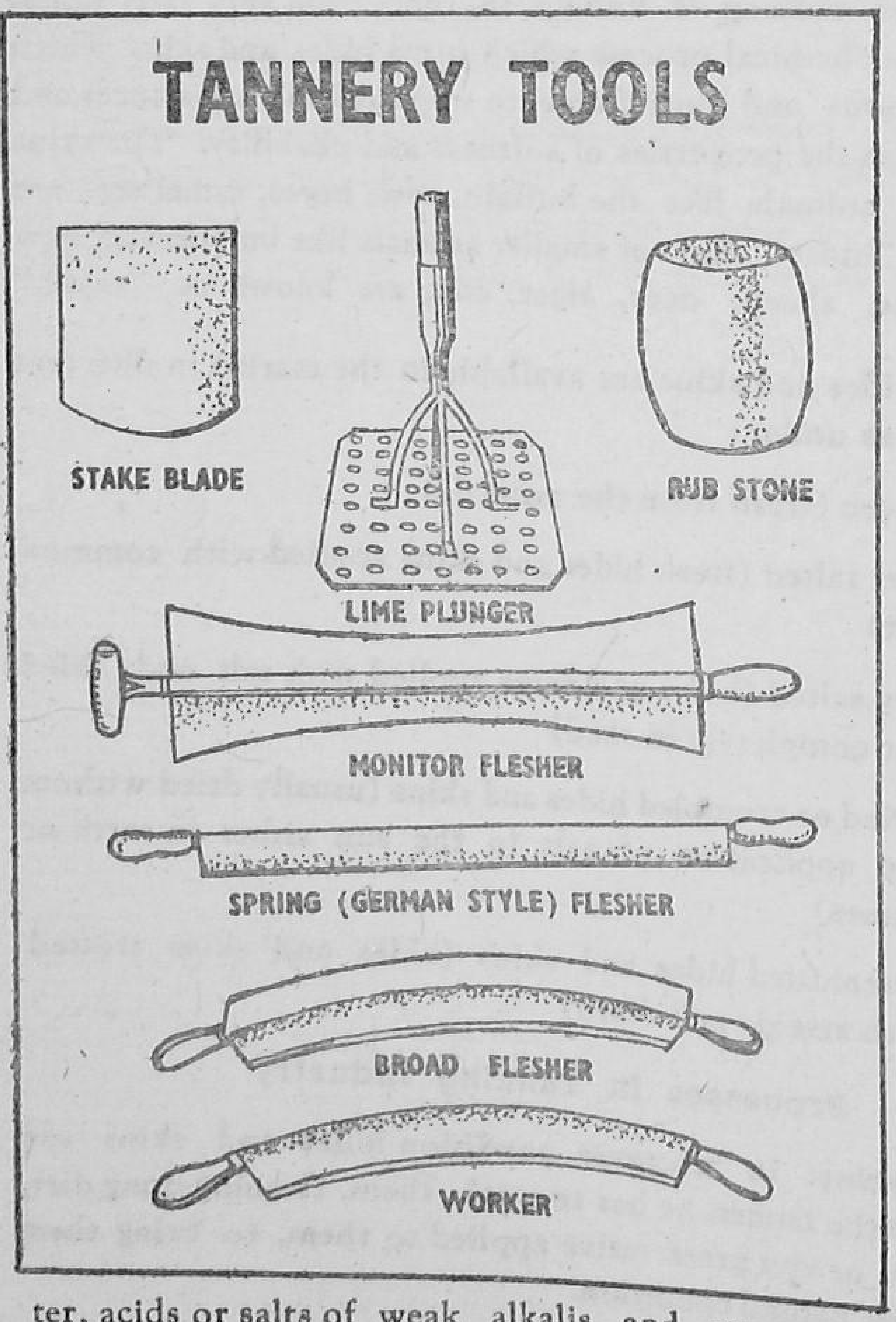
The hides and skins are available in the market in different conditions as under :

1. Green (fresh from the animals)
2. Wet salted (fresh hides and skins applied with common salt)
3. Dry salted (hides and skins applied with salt and dried out completely in shed)
4. Dried or crumpled hides and skins (usually dried without any application of salt in the sun either on earth or frames)
5. Arsenicated hides and skins (hides and skins treated with arsenic and dried)

Processes In Tanning Industry

i) Soaking: in whatever condition hides and skins are available to the tanner, he has to wash them, cleaning dung dirt, blood, salt or any preservative applied to them, to bring them back to their natural condition.

ii) Liming: After soaking, the pelt (pelt is a technical term used in Leather Technology for both hides and skins) is put into lime liquors straight or sharpened as the case may be, for removal of hair, hair bulb, fat gland etc. and plumping of hides substance for further treatment of the pelt.



iii) Deliming: After pelt is limed, unhaired, fleshed and scudded, it is delimed, as presence of calcium precipitates the tannins in bark tanning, and chromium and other salts in mineral tannages. Deliming can be achieved by simple thorough washing with water, acids or salts of weak alkalis and strong acids, according

to the type of the leather and the quality required in the finished products.

iv) Pickling : Pelts meant for chrome tanning are generally pickled to bring the pelts into acidic condition prior to treatment with chrome liquors. This is known as pre-tannage in Leather Technology.

v) Tanning : There are five types of tanning proeesses. They are :

TANNING

- (a) Vegetable Tanning
- (b) Mineral Tanning
  - i) Alum Tanning
  - ii) Chrome Tanning
  - iii) Iron Tanning
- (c) Aldehyde Tanning
- (d) Oil Tanning
- (e) Synthetic Tanning

(a) Vegetable Tanning : This tanning is done by using leaves, flowers or fruits and barks which are rich in tanning contents of either the catechol type or the pyragallol type or a combination of both.

In India there are many vegetable tanning materials available. The most commonly used and at present in the industry, are: i) Babul ii) Myrabolan and iii) Turwad or Avarambarks.

The usual methods of tanning : (i) Bag tanning, (ii) Pit or Vat tanning, and (iii) Drum and paddle tanning. Nos. (i)and (ii) are mainly practised in villages and factories which do not use power. No. (iii) is practised only by factorises well-equipped with power and modern machinery.

The process of vegetable tanning takes about 6 to 8 weeks for completion of tannage.

b) Mineral Tanning : The most common in this type is chrome tanning. The basic salts of Alum and Iron can also be utilized for tanning purposes. These, however, are not found to be as stable and permanent as those of the basic salts of chromium.

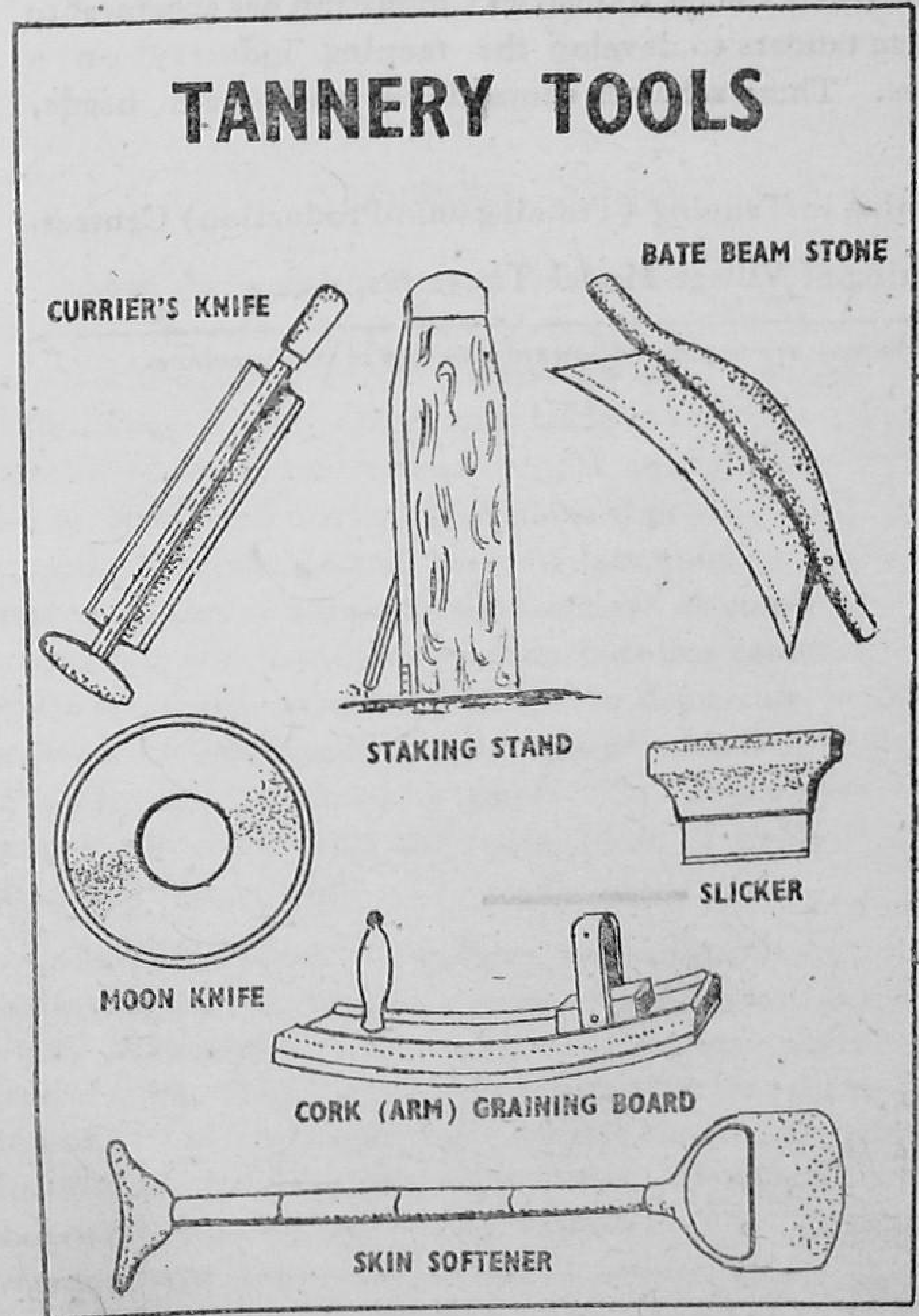
c) Aldehyde Tanning : Alkaline solution of Aldehyde gives white and washable soft leather after complete tannage.

d) Oil Tanning : Some oils like Cod and Shark oils are highly oxidisable in nature, and when impregnated in pelt, combine with the collegen fibres and turn into leather, giving properties of softness and pliability. In addition, they render the leather unputrefiable.

e) Synthetic Tanning : Synthetic tanning materials are the derivatives of phynolic compounds treated with aldehyde and sulphuric acid. These materials, when used in combination with vegetable tanning materials or chromium salts, give better colour, better grain effect and hasten tanning processes.

vi) Ageing : The pelt, after complete tanning is kept for some days in piled condition to complete reactions of tanning liquors present in the pelt with the hide substance. This is known as ageing in the leather industry. After ageing, the leather is split or shaved to required substance wherever evenness of the substance is required.

vii) Neutralization: This process is necessary only in case of mineral tannages like chrome.



viii) Dyeing and Fat Liquoring: The leather, after ageing or neutralization, is dyed where coloured leathers are required as in the case of uppers and other similar types of leathers, and fat liquored with the emulsion of soap, oil, turkeyred oil etc., in order to lubricate the fibres and impart softness to leather.

ix) Finishing: Leathers required for uppers etc., are coated with a mixture of colour pigments, dyes, binders etc. for even shades and gloss.

The Khadi and Village Industries Cmmission has schemes* to help the village tanners to develop the tanning industry on a scientific lines. These schemes come under two main heads, namely :

i) Training in Tanning (Training-cum-Production) Centres.

ii) Starting of Village Model Tanneries.

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* These Schemes are explained towards the end of this brochure.

CHAPTER VI

LEATHER GOODS

After the leather is tanned, it is ready for use. It can be used for a variety of purposes, principal among them being the manufacture of foot-wear. There are many leather workers in India. They are conversant with trade in all its branches. Due to want of adequate finance and proper organization for supply of raw materials and marketing of finished products, they are handicapped in the trade and have to face unfair competition from large-scale manufacturers in the country. A common production programme for the industry thus becomes essential and appropriate steps will have to be taken to demarcate production as between the village production and large-scale factory production. In determining a common production programme, however, proper appreciation of the composition of demand for leather goods will be helpful.

In 1954, some 74.0 million parts of Indian type and 17.4 million pairs of Western type foot-wear were produced, of which the organized sector accounted for 2.06 million or 3 per cent of the total production of Indian type and about 3.27 million or 15 per cent of the Western type foot-wear, the total production of the organised sector being 5.9 per cent of the total foot-wear production in the country. The production of Western type foot-wear by the factories constituted 5.6 per cent of their installed capacity. The balance of the production of foot-wear is accounted for by the cottage sector. The employment in foot-wear manufacture is fairly large. According to the Census of India, 1951, there were 4,01,672 self-supporting persons in the foot-wear industry. The following statement shows the regional distribution of these cobblers in the country :

North India	East India	South India	West India	Central India	North India	India (Total)
65,491	45,835	61,333	50,793	89,355	88,865	4,01,672

It is not possible to state the number of persons employed in the organized and cottage units separately, though it may not be wrong to assume that the bulk of the number is employed in the cottage sector.

Though the prodution of foot-wear appears large, its per capita availability at present is very low, averaging roughly at 0.23 pairs and 0.28 pairs for rural and urban areas respectively. On this basis, 91.4 million pairs are available for consumption at home; 1.22 million pairs or 1.4 per cent of the production is exported to countries like Burma and Thailand.

The demand for leather consists in the demand for production of foot-wear and other consumer goods, like travel-goods, fancy goods and industrial products like pickers, roller skins, beltings, etc. as well as the demand for exports of hides and skins. The production of foot-wear in 1954 in the organized and cottage sectors was about 91.4 million pairs of foot-wear comprising 74 million pairs of Indian type and 17.4 million pairs of Western type. On the basis that for one million pairs of foot-wear 1.2 lakhs of hides and 0.47 lakhs of skins are required, it may be estimated that the manufacture of 91.4 million pairs offoot-wear vould require 11.05 million hides and 4.30 million skins India is a regular exporter of hides and skins, the exports being roughly 2.6 million tanned hides and 6.05 million tanned and raw skins. The remaining hides and skins are consumed in the production of leather goods other than foot-wear.

We have seen that the organised sector of the leather industry produced only 3 per cent of the total production of Indian type of foot-wears and 15 per cent of the Western

type. The total share of the organized sector for all foot-wear production in the country is thus only 5.9 or 6 per cent. The rest are all manufactured by self-supporting or self-employed producers, mostly in the cottage sector. But the cottage or village producer, as has already been pointed out, suffers from many disabilities. Some of the disabilities are :

(1) **Supply of raw materials :**

(a) **Hides and Skins :** Many of the hides and skins available for flaying are defective due to either delayed procurement or the branding and goad marks found on the carcasses. The availability of good hides and skins is not adequately large.

(b) **Tanning Materials :** Several kinds of vegetable tanning substances, chemicals, oils and tallow are used in tanning. There is a general inadequacy of the vegetable tanning substances, particularly of wattle bark in the country. India is, therefore, obliged to import wattle and other materials from abroad to the tune of Rs. 9 to Rs. 16 million every year. The problem of obtaining enough tanning materials from indigenous sources will be more acute when there is an increase in the availability of hides and skins for processing.

(2) **Production Technique :** Most of the flayers and village tanners are either ignorant of the improved methods of processing hides and skins or have not the resources to employ them. Therefore, not only the percentage of yield of leather is low, but the products are considered to be of poor quality.

(3) **Marketing :** Though the flayer, tanner and the shoe-maker live in the same neighbourhood, there is a wide gap created between them by the existence of a multiplicity of agencies which handle the pieces from the stage of the raw hide or skin to the stage of the finished piece or leather article. This sector makes it difficult for the village tanner or the village shoe-

maker to have a regular supply of raw materials from his own neighbourhood at a fair price. These middlemen clear large profits and make the cost of production rather high for the village leather workers.

Solution Of The Problems

The problems of the village leather industry can be solved by developing the industry on the following lines :

(i) **Better Organization of Production and Marketing:** The tanners and shoe-makers in the villages are unorganised and hence unable to stand the competition of the organised sector. Their immediate needs are (a) a regular source of supply of raw materials; (b) credit ; and (c) facilities for marketing their products. These needs can be met by the organisation of these artisans into multi-purpose co-operative societies.

(ii) **Better technique of production :** Some of the methods of flaying and tanning adopted by the village workers are considered to be wasteful as well as defective. It is, therefore, essential to acquaint them with better technique in the various processes relating to flaying and tanning.

(iii) **Fuller utilization of by-products :** Not only the recovery of by-products from the carcasses, but their conversion into finished products like bone-meal, glue and tallow is necessary for the purpose of bringing prosperity to the village leather workers.

CHAPTER VII

COMMON PRODUCTION PROGRAMME

By far the best solution to the problems of the village industry, however, consists in the formulation of a common production programme for the various sectors in the industry. As the Planning Commission stated in its Report, the planning and development of village industries and other small industries should be conceived as a part of the process of formulating policies and programmes for the related large-scale industries. Otherwise, it will be very difficult to promote the smaller industries. Such a policy and programme may eliminate competition between the organised and cottage sectors.

A Common Production Programme for an industry necessarily implies a measure of control by the Government especially over the organised side of the industry. A Common Production Programme for the leather industry will involve acceptance of production allocation between the organised and cottage sectors both in tanning and foot-wear manufacture.

Apart from the competition of the leather footwear industry in the organised sector, there is the competition of the rubber foot-wear industry. According to the Monthly Statistics of the Selected Industries in India, there were in 1954 some 19 rubber footwear factories whose annual rated capacity and actual production were 41.1 and 31.2 millions respectively. The per capita availability of this type of foot-wear is 0.08 pairs. The case for a ceiling on the leather foot-wear manufacture of the organised sector applies to rubber foot-wear manufacture also.

(ii) Prohibition of exports of raw hides and skins: The export of raw hides has already been prohibited by the Government. It is equally essential to stop the exports of raw

skins and encourage those of only tanned and dressed skins.

(iii) **Conservation of Tanning Materials:** Wattle is of vital importance to the tanning industry, but its present supplies are inadequate. Some facilities have been provided in certain States for the Cultivation of wattle. In Madras, schemes are in operation to cultivative wattle on about 20,000 acres of land. Nursery tests are also being conducted in other States like U. P., Punjab, West Bengal, Assam and Bombay. Other States also must be directed to formulate schemes for the cultivation of wattle. Apart from wattle there is a wealth of other tanning substances, Babul and Tarwad in India's forests.

(iv) **Legislation to ensure the quality of hides and skins:** In certain areas some customs and traditions render the lifting of carcasses difficult. The system of branding the animals and mal-treatment of drought cattle also affect the quality of the hides. Legislation at Central or States levels should be passed removing these factors which affect the supply and quality of hides. For instance, co-operative tanning Centres may be empowered to lift carcasses without legal disabilities.

(v) **Development of hand process in tanning and footwear manufacture:** The prosperity of cottage workers is the index of national prosperity. Every effort should be made to develop the cottage sector by means of phased development programme covering the various aspects of the village leather industry.

The programmes of the Khadi and Village Industries Commission, however, are mainly directed, at present, towards proper recovery work and training of personnel for it. It also seeks to train village tanners in improved techniques and processes.

CHAPTER VIII

THE PROGRAMME

What these programmes are and how they are sought to be implemented, is briefly explained here.

1

Village Demonstration Parties : A village demonstration party is actually a party which starts a carcass recovery centre. The duration of the stay of demonstration by the party in any one place is of six months. Its activities include organisation, training and the formation of the co-operative society which will work the programme in the area. The areas which the demonstration party selects will be such that in these areas at least 300 carcasses will be available in a year. After covering one area, the party will proceed to another selected area. Two such parties are allotted to a zone and these parties will establish four carcass recovery centres in a zone in a year. The cost of one village demonstration party will be :

a. **Non-recurring :** (For One Carcass Recovery Centre)

1. Flaying shed, store room tools and equipment, bullock cart, well-sinking, hand-pump etc.	Rs. 5,100
2. Bone digester	Rs. 1,000

b. **Recurring expenditure :**

1. Cost of feeding bulls equipped for the bullock cart	Rs. 500
2. Travelling allowance and contingencies	Rs. 600

3. Staff : (for one party)

1. One Tanner-cum-Supervisor	Rs. 150 p.m. consolidated.
2. Two Flayers each	Rs. 60 p.m. ,,
3. One Labourer	Rs. 40 p.m. ,,

The Khadi and Village Industries Commission has, so far distributed 61 carcass recovery centres to various institutions.

2

Flaying Centres: A Flaying Centre is generally allotted to a registered institution or co-operative society in the selected area in a zone where a group of villages within 5 to 7 miles have a cattle population of 3,000. Carcasses available annually should be between 250 and 300 in these areas. The cost of running a Flaying Centre is roughly as follows :

a. **Non-recurring:**

Implements	Rs. 400
Bullock cart with bulls	Rs. 1,000
Platform and shed	Rs. 2,000
Bone digester	Rs. 1,000
Well, if necessary	Rs. 1,000
Miscellaneous	Rs. 600
	Rs. 6,000

b. **Recurring:**

Salary of two workers (Flayers) @ Rs. 60 p. m. Rs. 1,440.

On allotment of a flaying centre, the institution will be eligible to get the aid specified below, subject to the conditions laid down for the purpose:

1. A loan equal to 50% of the non-recurring expenditure.	Rs. 3,000
2. A subsidy equal to 50% of the non-recurring expenditure.	Rs. 3,000
3. A loan equal to 50% of recurring expenditure to provide working capital for salary of two workers.	Rs. 720
	Rs. 6,720

c. **Likely Receipts:**

Taking a minimum of 200 dead animals per annum on commercial basis the income will be as follows:

Hides (200)	@ Rs. 12.37 each	Rs. 2,500
Bones (each animal)	@ Rs. 1.50	Rs. 300
Flesh (,,)	@ Rs. 1.50	Rs. 300
Tallow(,,)	@ Rs. 3.00	Rs. 600
		Rs. 3,700

d. Institutions applying for allotment of a flaying centre or centres should furnish the information required by the Leather Industry Section of the Commission. The Khadi and

Village Industries Commission has so far distributed 307 Flaying Centres to various institutions in different parts of the country.

3

Bone-crushing Units:

A sum of Rs. 3,300 has been provided under each unit and the break-up of the expenditure is as under:

A. **Non-recurring:**

Shed	Rs. 1,000
Bone Digester	Rs. 1,000
Miscellaneous	Rs. 300

B. **Recurring :**

Working capital Rs. 1,000. On allotment of a Bone Crush ing Unit the Institution will be entitled to get the following loan and subsidy:

1. Loan for meeting the working capital and 50% of the non-recurring expenditure — Rs. 2,150
2. Subsidy for meeting 50% of the non-recurring expenditure — Rs. 1,150

The Khadi and Village Industries Commission has so far allotted 56 Bone crushing units to various institutions in the country.

4

Training in Carcass Recovery :

The Institution or society taking up a Flaying, Carcass,

Recovery or bone crushing centre or centres, is entitled to depute one candidate each for training in carcass recovery training centre at Kora Gramodyog Kendra, Shimpavali, Borivli, Bombay. Expenditure not exceeding the amounts indicated below will be borne by the Commission on each trainee so deputed :

a. Actual travelling expenses (single III class fare both ways) to a trainee.

b. Stipend to a trainee at Rs.40 p.m. for a period of 4 months.

c. Tuition fee at the rate of (maximum) Rs. 25 p.m. for a period of 4 months.

Students deputed by the Community Project Administration or State Governments are also trained.

5

Training in Tanning :

These centres are allotted to the registered institutions or co-operative societies. The Centre will be located in a tannery of the institution to which the Centre is allotted or in a rented tannery. The institution taking up a centre of this nature will be entitled to a loan of Rs. 10,000 at 3% interest towards working capital and grant for construction of hostel, extension of water supply, purchase of tools etc. In this centre fifteen students on a stipend of Rs. 40 per month each will be trained by the staff of the centre. The duration of training is one year during which instruction will be imparted in training and leather goods manufacture. The aid given by the Board is as under :

i. **Loan:**

Towards working capital of a Training-cum-Production Centre to a registered co-operative society or a registered institution at 3%interest, repayable within twelve months. Rs. 10,000

ii. **Subsidy:**

Grant for hostel for trainees Rs. 5,000

iii. Provision for water pump Rs. 2,000

iv. Tools and equipment for flaying and tanning Rs. 4,150

v. Additional grant for tools and equipment for flaying and tanning & Leather goods. Rs. 2,650

Recurring :

Rent for tannery (at the rate assessed) Rs. 3,600

Stipends:

Stipends for 15 students for 12 months @ Rs. 40 p. m. Rs. 7,200

a. **Staff :**

1. Tanner-cum-superintendent Rs. 250 p.m. consolidated
2. Tanner Rs. 125 p. m. ,,
3. Leather-Goods-Instructor Rs. 125 p. m. ,,
4. Master Flayer Rs. 100 p. m. ,,
5. Mistri Rs. 40 p. m. ,,
6. Two labourers each Rs. 40 p. m. ,,
7. Clerk Rs. 55-10-105-EB-10-155 ,,

There are eight training-cum-production Centres running in different States at present. Four more will be set up in other States during the year 1957-58. The centres where the training is given at present are :

1. Sri Gandhi Niketan Ashram, T. Kallupatti, Madurai Dist., Madras State.
2. Hyderabad Khadi & V. I. Board, Sarvodaya Ashram, Survail, Nalgonda District, Hyderabad, Andhra State.
3. Nidubrolu Leather Goods Manufactures Co-operative Society Ltd., Nidubrolu, Guntur Dist., Andhra Pradesh.
4. All India Sarva Seva Sangh, Goseva Charmalaya, Nalwadi, Wardha, Bombay State.
5. Bombay Suburban Dist. Village Industries Association, Kora Gramodyog Kendra, Shimpavali, Borivli, Bombay.
6. Khadi Pratisthan, 18, South Tangra Road, Calcutta, West Bengal.
7. Sri Gandhiniketan Ashram, Sewapuri, Banaras, U. P.
8. Madhya Bharat Khadi and Village Industries Board, Dewas Tannery, Dewas, M. P.

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Village Model Tannery :

In India 80 per cent of tannage is being done by village tanners either in groups or individually and the remaining only 20 per cent by organised tanneries. According to the data available from the 1955 census, 89,378 persons are engaged

in leather tanning and dyeing. There are 275 organised tanneries which employ in all only 12,560 workers. Besides these, there are 500 other tanneries distributed all over the country, mostly in villages, where tanning is done by hand and they employ roughly some 23,000 workers. The remaining 35,650 persons are obviously independent cottage workers. The lot of these and other village tanners in unsatisfactory. With a view to improve the lot of village tanners and to develop the quality of the leather produced by them, the Khadi and Village Industries Commission has started Village Model Tanneries in areas, which have six to seven flaying centres. The financial assistance is detailed below:

1. Tanning Shed, tanning pits, drains, compound walls, equipment etc.	Rs. 10,000
2. Working Capital	Rs. 7,000
3. Cost of Land	Rs. 1,000
Total for one Village Model Tannery	Rs. 18,000

A sum of Rs. 18,000 has been provided under each Village Model Tannery are as follows :

Grant for meeting 75% cost of capital expenditure and cost of land.....	Rs. 8,250
Loan for meeting 25% cost of capital expenditure and the cost of land.	Rs. 2,750
	Rs. 11,700
Loan for meeting Working capital up to maximum	Rs. 7,000
	Rs. 18,000

So far 82 such tanneries have been allotted to various institutions.

Financial Assistance For Construction of New Pits and Repairs of Old Pits

1. Subsidy for the construction of new pits up to a maximum of	Rs. 200 per pit
2. Subsidy for the repairs of old pits up to a maximum of	Rs. 50 ,,

The Khadi and Village Industries Commission has so far given financial assistance for the construction of 636 new pits and repairs to 1,098 old pits to various institutions.

The application should be accompanied by advance receipt duly signed in duplicate along with the guarantee bonds duly supported by the Officer of the Commission or any other competent authority.

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Glue Manufacturing Units :

Grant :	Grant for meeting 75% of non-recurring expenditure on sheds, pits, tools and equipment, etc., per unit	Rs. 2,250
	Grant for meeting 75% of cost of land per unit	Rs. 750
Loan:	Loan for meeting 25% of non-recurring expenditure on sheds, pits, tools, and equipment etc.	Rs. 750
	Loan as working capital per unit	Rs. 2,000
	Loan for meeting 25% of cost of land per unit	Rs. 250

The Khadi and Village Industries Commission has allotted 7 such units.

Bigger Marketing Depots:

Grant: Grant for meeting establishment charges for 12 months and non-recurring expenditure per depot, provided that the establishment charges per depot shall not exceed the maximum limit of Rs. 15,000 per year — Rs. 22,000

Loan: Working capital for the Co-operative Societies/ Registered Boards/ Statutory State Boards for establishing big depot for marketing hides and skins, tanned leather and other leather goods including foot-wear per depot. — Rs. 25,000

The Khadi and Village Industries Commission has allotted so far 9 such depots to the Institutions.

Small Marketing Depots:

Grant: Grant for meeting establishment charges for 12 months and non-recurring expenditure per depot provided that the establishment charges per depot shall not exceed the maximum limit of Rs. 3,300 per year. — Rs. 4,000

Loan: Working capital for establishing small depot for marketing hides and skins, tanned leather and other leather goods including foot-wear per small depot. — Rs. 15,000

All the units referred above are allotted to the different

institutions, co-operative societies, State Boards, C. P. Areas and Intensive Areas.

In addition to these units the financial assistance has also been given to 50 individual cobblers @ Rs. 50 each during the year 1955-56.

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Experience of the working of the Commission's schemes and the surveys conducted by its Leather Industry Section, have revealed the inadequacy of its programmes. Independent workers in the field of leather training and manufacture, who are scattered in the villages need special attention. Their condition is backward and they have no resources to apply improved techniques and use improved tools. Though they have the skill and the aptitude, their economic position condemns them to pursue their occupation in precarious conditions.

The Commission has, therefore, come to the conclusion that its programme for development of the village leather industry should include steps to aid this class of workers whose number is large. They are mainly engaged in foot-wear and leather goods manufacture. The assistance proposed is to give financial aid for purchase of tools, equipment and raw materials and to provide them working capital required so that they may ply their trade as self-employed workers in conditions favourable for their progress.

Within the compass of a pamphlet of this nature, it is not possible to detail all the processes involved in the different branches of the village leather industry. Nor is it possible to give detailed information about how to start a particular Centre, the course and nature of training etc.

For fuller details, the Organiser, Village Leather Industry, Khadi and Village Industries Commission, Bombay, may be approached.

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